

**National Status and Trends Program**  
for Marine Environmental Quality

**Mussel Watch Project Site Descriptions, through 1997**



Silver Spring, Maryland  
June 1997

**US Department of Commerce**

**noaa** NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

---

Coastal Monitoring and Bioeffects Assessment Division  
Office of Ocean Resources Conservation and Assessment  
National Ocean Service

**Coastal Monitoring and Bioeffects Assessment Division  
Office of Ocean Resources Conservation and Assessment  
National Ocean Service  
National Oceanic and Atmospheric Administration  
U.S. Department of Commerce  
N/ORCA2, SSMC4  
1305 East-West Highway  
Silver Spring, MD 20910**

Notice

---

This report has been reviewed by the National Ocean Service of the National Oceanic and Atmospheric Administration (NOAA) and approved for publication. Such approval does not signify that the contents of this report necessarily represent the official position of NOAA or of the Government of the United States, nor does mention of trade names or commercial products constitute endorsement or recommendation for their use.

---

## **Mussel Watch Project Site Descriptions, through 1997**

G. G. Lauenstein, A. Y. Cantillo, S. Kokkinakis, S. Frew, H. J. Jobling and R. R. Fay

Silver Spring, Maryland  
June 1997

---

United States  
Department of Commerce

National Oceanic and  
Atmospheric Administration

National Ocean Service

William M. Daley  
Secretary

D. James Baker  
Under Secretary

Nancy Foster  
Assistant Administrator

---



TABLE OF CONTENTS

LIST OF TABLES..... i  
LIST OF FIGURES..... ii  
LIST OF ACRONYMS AND ABBREVIATIONS..... iv  
ABSTRACT..... 1  
1. INTRODUCTION..... 1  
2. BIVALVE STUDY AREAS..... 3  
    2.1. East Coast..... 3  
    2.2. Gulf of Mexico..... 3  
    2.3. West Coast..... 4  
    2.4. Great Lakes..... 5  
    2.5. Puerto Rico..... 5  
3. SEDIMENT SITE SELECTION CRITERIA..... 5  
4. IMPORTANT POINTS..... 6  
5. REFERENCES..... 7  
  
APPENDIX A..... 9  
    MAINE SITES..... 35  
    NEW HAMPSHIRE SITE..... 39  
    MASSACHUSETTS SITES..... 40  
    RHODE ISLAND SITES..... 57  
    CONNECTICUT SITES..... 62  
    NEW YORK SITES [Atlantic]..... 66  
    NEW JERSEY SITES..... 79  
    DELAWARE SITES..... 89  
    MARYLAND SITES..... 92  
    VIRGINIA SITES..... 98  
    NORTH CAROLINA SITES..... 107  
    SOUTH CAROLINA SITES..... 114  
    GEORGIA SITES..... 118  
    FLORIDA SITES - Atlantic Coast..... 121  
    PUERTO RICO SITES..... 127  
    FLORIDA SITES - Gulf Coast..... 130  
    ALABAMA SITES..... 161  
    MISSISSIPPI SITES..... 164  
    LOUISIANA SITES..... 167  
    TEXAS SITES..... 187  
    CALIFORNIA SITES..... 215  
    OREGON SITES..... 257  
    WASHINGTON SITES..... 266  
    ALASKA SITES..... 285  
    HAWAIIAN SITES..... 297  
    WISCONSIN SITES..... 301  
    ILLINOIS SITES..... 303  
    INDIANA SITES..... 304  
    MICHIGAN SITES..... 305  
    OHIO SITES..... 314  
    NEW YORK SITES [Great Lakes and Hudson River]..... 319  
  
Appendix B..... 327

Appendix C.....	349
Index by site and location.....	349
Index by site code.....	353

## LIST OF TABLES

B.1.	Mussel Watch Project site codes, names, locations and sample matrices.....	327
B.2.	Mussel Watch Project tissue sampling years.....	333
B.3.	Mussel Watch Project sediment sampling years.....	338
B.4.	Mussel Watch Project target collection dates .....	343

LIST OF FIGURES

1. NS&T Mussel Watch sites in Maine.....10

2. NS&T Mussel Watch sites in Massachusetts and New Hampshire.....11

3. NS&T Mussel Watch sites in Rhode Island. ....12

4. NS&T Mussel Watch sites in Long Island area.....13

5. NS&T Mussel Watch sites in the Hudson Raritan Estuary and the Hudson River.....14

6. NS&T Mussel Watch sites on the outer New Jersey shore.....15

7. NS&T Mussel Watch sites in Chesapeake and Delaware Bays. ....16

8. NS&T Mussel Watch sites in North Carolina.....17

9. NS&T Mussel Watch sites in South Carolina and Georgia.....18

10. NS&T Mussel Watch sites in peninsular Florida.....19

11. NS&T Mussel Watch sites in Tampa Bay. ....20

12. NS&T Mussel Watch sites in the panhandle of Florida. ....21

13. NS&T Mussel Watch sites in Mississippi and Alabama. ....22

14. NS&T Mussel Watch sites in Louisiana and Mississippi. ....23

15. NS&T Mussel Watch sites in western Louisiana.....24

16. NS&T Mussel Watch sites in southeast Texas. ....25

17. NS&T Mussel Watch sites in southwest Texas. ....26

18. NS&T Mussel Watch sites in southern California.....27

19. NS&T Mussel Watch sites in central and northern California. ....28

20. NS&T Mussel Watch sites in northern California and Oregon.....29

21. NS&T Mussel Watch sites in Washington.....30

22. NS&T Mussel Watch sites in the panhandle of Alaska.....31

23. NS&T Mussel Watch core sites in Cook Inlet and Prince William Sound.....32

24. NS&T Mussel Watch sites in Hawaii.....33

25.	NS&T Mussel Watch sites in Puerto Rico.....	33
26.	NS&T Mussel Watch sites in the Great Lakes.....	34

## LIST OF ACRONYMS AND ABBREVIATIONS

cm	Centimeter
FM	Farm to Market, refers to certain roads in Texas
GERG	Geochemical and Environmental Research Group/TAMU
GPS	Global Positioning System
hr	Hour
ICWW	Intercoastal Waterway
m	Meter
mi	Mile
min	Minute
MLLW	Mean lower low water - a tidal datum. The arithmetic mean of the lower low water heights of a mixed tide observed over a specific 19-year Metonic cycle (the National Tidal Datum Epoch). Only the lower low water of each pair of low waters, or the only low water of a tidal day is included in the mean.
MLW	Mean Low Water
nm	Nautical mile
NOAA	National Oceanic and Atmospheric Administration/Dept. of Commerce
NS&T	National Status and Trends Program/NOAA
ORCA	Office of Ocean Resources Conservation and Assessments
SAV	Submerged aquatic vegetation
TAMU	Texas A&M University, College Station, TX
USCG	U.S. Coast Guard
USGS	U.S. Geological Survey
WHOI	Woods Hole Oceanographic Institute

## Mussel Watch Project Site Descriptions through 1997

G. G. Lauenstein, A. Y. Cantillo, S. Kokkinakis, S. Frew, H. J. Jobling<sup>\*</sup>, and R. R. Fay<sup>\*</sup>

Coastal Monitoring and Bioeffects Assessment Division  
Office of Ocean Resources Conservation and Assessment  
National Ocean Service  
National Oceanic and Atmospheric Administration

### ABSTRACT

In response to concerns over environmental quality of the Nation's coastal and estuarine ecosystems, the National Oceanic and Atmospheric Administration created the National Status and Trends (NS&T) Program in 1984. The NS&T Mussel Watch Project began in 1986 and monitors concentrations of trace and major elements and organic contaminants in bivalve mollusks and sediments. This document provides detailed descriptions of the Mussel Watch Project sampling sites through 1997. Coordinates are the most recent available for a specific site, and are usually based on chart data and Global Positioning System coordinates.

### 1. INTRODUCTION

The National Oceanic and Atmospheric Administration (NOAA) National Status and Trends (NS&T) Program began coastal monitoring in 1984 with its National Benthic Surveillance Project. That project measured trace elements and organochlorine contaminants in benthic fish and associated sediments. The National Benthic Surveillance Project was active through 1994. Its analytical methods were documented in Lauenstein and Cantillo (eds.) (1993) and site descriptions documented in Lauenstein *et al.* (1993). The Mussel Watch Project began in 1986 and quantifies the same suite of contaminants in bivalve mollusks and associated sediments. Additionally, the Mussel Watch Project quantifies polycyclic aromatic hydrocarbons. Methods and earlier site information are provided in Lauenstein and Cantillo (eds.) (1993) and Lauenstein *et al.* (1993), respectively. The purpose of this current document is to provide updated and more detailed information for all Mussel Watch Project sites, including new sites established since 1992.

The National Mussel Watch Project initially sampled 158 sites with mollusks collected at 145 of them and only sediments collected at the remainder of the sites. The Mussel Watch Project has now increased its monitoring effort to 289 sites of which 282 are bivalve sites (Tables 1, 2 and 3).

On the Gulf Coast, Mussel Watch Project samples have been collected and analyzed by the Texas A&M (TAMU) University Geochemical and Environmental Research Group (GERG). Battelle Ocean Sciences was responsible for the U.S. East and West Coasts from 1986 through 1994. Science Applications International Corporation was responsible for the first four years of the Californian and Hawaiian portions of the West Coast effort. In 1995 and 1996, all Mussel Watch Project samples were collected by GERG with the exception of the Great Lakes samples, which were collected by NOAA personnel. In 1997 NOAA personnel collected samples from Maine through North Carolina while GERG personnel collected the remaining marine samples.

---

<sup>\*</sup> Geochemical and Environmental Research Group, Texas A&M University, College Station, TX 77845.

Criteria for the selection and sampling of National Status and Trends Mussel Watch sites are that:

- The site should integrate contaminant accumulation from nearby or surrounding areas and should be outside the zone of initial dilution of a dumpsite or point-source discharge.
- Sampling substrates are limited to rock or concrete (including rip-rap and jetties), and sand or mud (or mangrove roots in the case of *Crassostrea rhizophorae*). Structures such as wooden pilings and metallic navigation aids are avoided in order to eliminate potential contamination.
- Indigenous populations of mollusks must exist because transplanted mussels are not used in the regular monitoring effort.
- Suitable bivalve size ranges are: 7 - 10 cm for *Crassostrea virginica* and *C. rhizophorae*, 5 - 8 cm for the *Mytilus* species, and 2 - 3 cm for *Dreissena polymorpha* and *D. bugensis*.
- The NS&T Mussel Watch Project selected sites that were also sampled by the earlier Environmental Protection Agency (EPA) Mussel Watch monitoring program (Palmieri *et al.*, 1984). Selecting sites that are coincident to the two monitoring efforts allows decadal comparisons between estuarine contaminants (Lauenstein *et al.*, 1990; Lauenstein, 1995). Some locations formerly sampled by the EPA no longer support bivalve populations.
- Sites must have sufficient bivalves, such that repeated annual harvesting will not seriously deplete the resource. Approximately 50 bivalves of the larger species are collected for each set of analyses. Smaller species samples need a correspondingly larger number of specimens.
- Sites must be suitable for follow-up sampling (e.g., not anticipated to be physically disrupted by development activities or dredging).
- Mussel Watch Project sites are collected in late fall and winter. Once a site and field sampling methods are established, repeat sampling occurs within  $\pm 3$  weeks of that sampling date. The rationale for winter sampling is to avoid collecting spawning organisms. The exception is that the Great Lakes samples are collected during August of each year.

Newly established sites are assigned a new site name and unique site code. Sites that have been minimally relocated may retain the same name or may be renamed if the new name better signifies the relocated site.

The number of species sampled is kept to a minimum in order to facilitate comparisons among sites. The species collected include the blue mussel (*Mytilus edulis*) from Maine to Delaware Bay. *M. edulis* alternates with the California mussel (*Mytilus californianus*) for West Coast collections. From Delaware Bay south and throughout the Gulf of Mexico, the American oyster (*C. virginica*) is sampled. Areas distant from the conterminous United States and those specimens collected in fresh water require the collection of alternate species. The Hawaiian oyster (*Ostrea sandvicensis*) is taken at Hawaiian Islands sites. The species collected in Puerto Rico is the mangrove oyster (*Crassostrea rhizophorae*). At a site in southern Florida, the smooth edged jewel box (*Chama sinuosa*) is collected. In the Great Lakes, the zebra mussel and quagga mussel (*Dreissena polymorpha* and *D. bugensis*, respectively), both introduced species (Wright *et al.*, 1996), are harvested.

Sites in Puerto Rico (three) were added in 1992. Great Lakes sites have been added each year since 1992, with 24 sites currently collected. Sites have been established in all of the Great Lakes with the exception of Lake Superior.

Though the predominant mussel species collected for this project has been identified as *M. edulis*, there is some uncertainty whether mussels found on the U.S. West coast are the separate species *Mytilus trossulus* and *Mytilus galloprovincialis*, or whether all three taxonomic groups are simply hybrids of each other. The question of whether these groups are separate species or are a species complex is discussed in detail in Seed, 1992.

Analyses of co-occurring species have been performed by the NS&T Program (NOAA, 1989). *M. edulis* and *C. virginica* on the East Coast, and *M. edulis* and *M. californianus* on the West Coast, were compared for trace element and organic contaminant concentrations. While differences were found between the abilities of *C. virginica* and *M. edulis* to concentrate certain trace elements, there was no clear difference between their abilities to bioaccumulate organic contaminants. No differences were found in the bioaccumulating abilities for *M. edulis* and *M. californianus* for either trace elements or organic contaminants.

## 2. BIVALVE STUDY AREAS

### 2.1. East Coast

The extremes in sampling environments, which are the norm for the West and Gulf Coast sites, are rare on the East Coast. The very high waves and extreme tidal ranges that dominate West Coast sampling strategies are very limited in geography on the East Coast. Likewise, sites that are tens of miles from the nearest launch site and require navigation through difficult and exposed passages are not characteristic of the East Coast sites. Sites are typically near shore, close to boat launching facilities, and for the most part are in protected waters. Many of the East Coast bivalve sites are accessible from the shore.

### 2.2. Gulf of Mexico

Distributional patterns of molluscan assemblages are dependent on water depth, substrate type, turbidity, salinity, and wave energy. The important inshore, estuarine, and lagoonal assemblages that apply to environments sampled by the Mussel Watch Project have been defined by Parker (1960) as:

I. Delta - Front Distributary and Interdisciplinary Assemblage - The largest and most dominant bivalves in these assemblages are:

*Rangia cuneata* - not as abundant as in river influenced assemblages;

*Rangia flexuosa* - more abundant in interdistributary bays;

*Macoma mitchelli* - rare;

*C. virginica* - very abundant in higher salinity interdistributary bays; and

*Petricolar pholadiformis* - common, but small.

II. Low Salinity Oyster Assemblage - The largest and most dominant bivalves in this assemblage are:

*C. virginica* - predominates in this zone; and

*Brachidontes recurvus* - at times very abundant.

Oyster reefs are abundant where salinity ranges from 10 to 30 ‰. Most oyster reefs are found in relatively shallow waters. Typically, large reefs form at right angles to the dominant current flow. These reefs are easily located and are a major geologic feature in most of the bays along the Gulf Coast. *C. virginica* is the dominant biomass as well as the most numerically-abundant large bivalve in the assemblage.

III. High Salinity Oyster Assemblage - The largest and most abundant bivalves in this assemblage are:

*Anomia simplex* - common, but small;  
*Brachidontes exustus* - common, attached to oyster valves, small;  
*Diplothyra smithii* - rare; and  
*Ostrea equestris* - abundant, long lived species.

High salinity reefs form near inlets on substrates of old shell where relatively high salinity water (34 to 36 ‰) is constantly renewed by tides. *O. equestris* is generally abundant and replaces *C. virginica* when salinity rises above 30 ‰. Over the long-term, drought cycles frequently result in the replacement of *C. virginica* with *O. equestris* (and vice versa in wet years) along most of the Gulf Coast (Parker, 1960). Thus, this assemblage is effectively identical to the "Low Salinity Oyster Assemblage" except where salinity causes the replacement of species with other closely related species. In this assemblage, *O. equestris* is typically the biomass dominant.

IV. Hyper-saline Lagoon Assemblage - The largest and most abundant bivalves in this assemblage are:

*Mulinia lateralis* - abundant, but small;  
*Tellina tampaensis* - moderately abundant; and  
*Anomalocardia auberiana* - very abundant.

Hyper-saline lagoons and estuaries are common along the lower Texas coast and have salinity's ranging from 40 to 80 ‰. The species in this assemblage are very abundant but are short-lived and small. The numerical dominant in this zone is *A. auberiana*.

Field teams have met with limited success in finding *C. virginica* in the high salinity bays in the lower Laguna Madre between Corpus Christi and Port Isabel. *O. equestris*, an ecological equivalent, usually replaces *C. virginica* in these areas.

Although *C. virginica* has a particularly wide salinity tolerance, a few areas that have been designated as sites are outside its range. The Bahia Honda Keys site in the Florida Keys is one such site. Here the target species is the smooth-edged jewel box, *Chama sinuosa*.

### 2.3. West Coast

Of the three marine coasts being sampled by the NS&T Program, the greatest extremes in topography and habitat types occur along the Pacific Coast. For distinguishing among different types of habitats along the West Coast, the following broad categories are identified in Ricketts *et al.* (1985): (I) Open Coast, (II) Protected Outer Coast, and (III) Protected Bays and Estuaries. Although it is recognized that gradations exist, this classification scheme provides a general overview of shore types.

I. "Open Coast" - These shorelines are entirely unprotected and subject to direct impact by wind and wave action. Such shores generally jut into the sea, varying from distinct

headlands to relatively modest bulges in the coastline. Fairly deep water is also usually present close offshore. Examples of areas that can be classified in this way occur along the central California Coast and include Pismo Beach, the Point Sur and Point Lobos outer rocks, and the outer reefs of Cypress Point and Point Pinos. Most of the coast of northern California and Oregon can also be included in this category.

II. "Protected Outer Coast" - This classification also includes stretches of open coast, but in locations where the direct impact of the surf is somewhat reduced. Protection may come from a variety of natural barriers such as headlands or close-lying islands, offshore reefs of submerged rock, long and gradually-sloping stretches of near shore rock and/or sand, offshore kelp beds, or simple refraction of waves around headlands or rocks. Examples of this type of coastline along California can be found in Santa Barbara, much of Monterey Bay, Half Moon Bay, Bodega Bay, and Point Arena.

III. "Protected Bays and Estuaries" - These are enclosed bays, sounds, or estuaries that experience the least wave action of the three types of coastal topographies. Due to the relatively low wave energy, exposure of mollusks in these areas is primarily a function of the rise and fall of tides. Coastlines in this category include protected areas with relatively small and often indirect openings to the outer coast. Examples of this type of shoreline include San Diego, Newport, Morro, San Francisco, Tomales, and Coos Bays, areas in Puget Sound, and all of the inside waters in southeastern Alaska.

#### 2.4. Great Lakes

The physical characteristics of the Great Lakes have been summarized by Powers and Robertson (1966).

The five Great Lakes in the heartland of North America constitute the greatest reservoir of freshwater on the surface of the earth. Lake Superior, with an area of 31,820 square miles (nearly half the area of New England), is the world's largest freshwater lake; Lake Huron ranks fourth in the world, Lake Michigan fifth, Lake Erie eleventh and Lake Ontario thirteenth. Together the five lakes cover 95,200 square miles and contain 5,457 cubic miles of water.

In 1988, zebra mussels were first found in Lake St. Clair. Because of their great rate of larval dispersal and the high fecundity of adults, zebra mussels have become the numerically dominant benthic organism, and seasonally, the dominant zooplankton community (Garton and Haag, 1993). Because of their ubiquitousness, zebra mussels serve as a natural monitoring tool.

Zebra mussels attach to hard substrates with their byssal threads. Almost any hard substrate will do: unionid clams, rocks, sticks, aquatic plants, and other zebra mussels.

#### 2.5. Puerto Rico

The bivalve species collected in Puerto Rico that closely resembles the American oyster is the Caribbean oyster (*Crassostrea rhizophorea*). These oysters are attached to the roots of mangroves in lagoons.

### 3. SEDIMENT SITE SELECTION CRITERIA

The NS&T Program sediment monitoring requires fine-grained sediment and thus avoids sand. In most cases, sediment sampling coincides closely to the bivalve stations. Because of the affinity of oysters for and the ubiquitous distribution of depositional zones in Gulf of Mexico estuaries,

coincident sediment and bivalve sampling was generally not difficult. However, this is not necessarily the case on the East and West Coasts. More often than not, the bivalve site is situated along the shoreline and the sediment site is located just offshore in deeper water where there are more suitable sediments for analysis.

The specific criteria for sediment sites are as follows:

- The site must be a sub-tidal (never exposed at lowest tides), low energy depositional area, as evidenced by providing surficial sediments that contain at least 20% fine grained material ( $\leq 64$  microns) on a dry weight basis.
- The site must be exposed to the same water mass as the corresponding bivalve site.
- The site must be located as near as possible to, and preferably not more than 2 km from, the bivalve site.
- The site must integrate contaminants from multiple sources in the surrounding area but should not reflect inputs from an individual point source of contamination.

#### 4. IMPORTANT POINTS

- This document provides site information to those using NS&T Mussel Watch Project data and aids those wishing to visit NS&T Mussel Watch Project monitoring sites. Samples were collected on both private and public lands and permission to collect samples is frequently required. It is the responsibility of individuals wishing to visit these monitoring sites to comply with all laws and to observe the property rights of private land owners.
- Maps have been included to assist with locating sites. Some sites are relatively close together and appear to be only minimally separated because of the resolution of the maps used.
- The site latitudes and longitudes provided here are more accurate than those provided in the previous sites technical memorandum (Lauenstein *et al.*, 1993), because in most cases they were derived from Global Positioning System technology. A small number of sites have been relocated because site access was no longer possible or population densities no longer allowed continued sampling. Such changes have been documented in the site descriptions (Appendix A)
- Water depths for the Mussel Watch Project sites are the depths of the bivalve collections. Mussel Watch water depths were most frequently based on actual measurements at the time of the 1995 and 1996 field collections. Depths are relative to Mean Lower Low Water, unless otherwise noted.
- Bivalve and sediment sites are generally co-located. The specific criterion was that bivalve and sediment sites were not to be separated by more than 2 km. In certain instances, it was not possible to stay within that requirement because bivalves, on occasion, were collected in high-energy environments where fine grained sediments (which are required by the NS&T Program) could not be found. When sediment sites were not closely associated with the bivalve site, the sediment location coordinates were also noted. Generally, when sediment and bivalve collections were separated by more than 4 nautical miles, the sediment site received its own site acronym.

Specific site information found in the appendices is taken from Jobling and Fay (1996) and Lauenstein *et al.* (1993) and from more recent field sampling experience of the authors.

Information detailing sampling and analytical methods for both projects can be found in Lauenstein and Cantillo (eds.), 1993.

## 5. REFERENCES

Garton, D. W., and W. R. Haag (1993) Seasonal reproductive cycles and settlement patterns of *Dreissena polymorpha* in Western Lake Erie. In: Zebra Mussels: Biology, Impacts, and Control. T. F. Nalepa and D. W. Schloesser (Eds.). Lewis Publishers, Boca Raton. 111-28.

Jobling, H. J., and R. R. Fay (1996) Mussel Watch Project. Volume 1-4. Field Sampling and Logistics Report. GERG Technical Report 96-069. TAMU/GERG, College Station, TX.

Lauenstein, G. G., A. Robertson, and T. P. O'Connor (1990) Comparison of Trace Metal Data in Mussels and Oysters from a Mussel Watch Programme of the 1970s with those from a 1980s Programme. Mar. Pollut. Bull., 21:440-447.

Lauenstein, G. G., and A. Y. Cantillo (eds.) (1993) Sampling and Analytical Methods of the National Status and Trends Program Benthic Surveillance and Mussel Watch Projects Analytical Protocols, 1984-1992. Vol. I-IV. NOAA Tech. Memo. NOS ORCA 71. NOAA/NOS/ORCA, Silver Spring, MD. 575 pp. plus appendices.

Lauenstein, G. G., M. R. Harmon, and B. Gottholm (1993) National Status and Trends Program for Marine Environmental Quality: Benthic Surveillance and Mussel Watch Projects monitoring sites. NOAA Tech. Memo. NOS ORCA 70. NOAA/NOS/ORCA, Silver Spring, MD. 353 pp.

Lauenstein, G. G. (1995) Comparison of organic contaminants found in mussels and oysters from a current Mussel Watch Project with those from archived mollusk samples of the 1970s. Mar. Pollut. Bull., 30(12): 826-833.

NOAA (1989) National Status and Trends Program for Marine Environmental Quality: A Summary of Data on Tissue Contamination from the First Three Years (1986-1988) of the Mussel Watch Project. NOAA Tech. Memo. NOS OMA 49. NOAA/NOS/ORCA, Silver Spring, MD. 22 pp plus appendices.

Palmieri, J., H. Livingston, and J. W. Farrington (1984) U.S. "Mussel Watch" Program: Transuranic Element Data from Woods Hole Oceanographic Institution 1976-1983. WHOI-84-28. WHOI, Woods Hole, MA. 73 pp.

Parker, R. H. (1960) Ecology and distributional patterns of marine macro-invertebrates, Northern Gulf of Mexico. Recent Sediments, Northwest Gulf of Mexico. A Symposium Summarizing the Result of Work Carried on Project 51 of the American Petroleum Institute 1951-1958. F. P. Shepard, F. B. Phleger, and T. H. van Andel (Eds.) The American Association of Petroleum Geologists. 302-37.

Powers, C. F., and A. Robertson (1966) The aging Great Lakes. In: Readings from Scientific American: Oceanography. W. H. Freeman and Company, San Francisco, CA. 397-405.

Ricketts, E. F., J. Calvin, and J. W. Hedgepeth (1985) 5th ed. Revised by David W. Phillips. Between Pacific Tides. Stanford University Press, Stanford, CA. 652 pp.

Seed, R. (1992) Systematic evolution and distribution of mussels belonging to the genus *Mytilus*: An overview. Am. Malacol. Bull., 9(2):123-37.

Wright, D. A., E. M. Setzler-Hamilton, J. A. Magee, and H. R. Harvey (1996) Laboratory culture of zebra (*Dreissena polymorpha*) and quagga (*D. bugensis*) mussel larvae using estuarine algae. J. Great Lakes Res., 22(1):46-54.

## Appendix A

### Sites description overview

The location of the Mussel Watch Project sampling sites are shown on the following pages. Detailed descriptions for each of the sites follow the site maps.

Each of the NS&T sites has a unique designating code. The code is a four letter code, that is taken from the site's name and location, e.g. PBPI - Pickering Island Penobscot Bay. The nominal site center is calculated from the mean of the three station locations at each of the sites. GPS navigation units were used to record nearly all the site locations. These data are a great deal more accurate than the old Loran C data, and generally tend to coincide with the map locations.

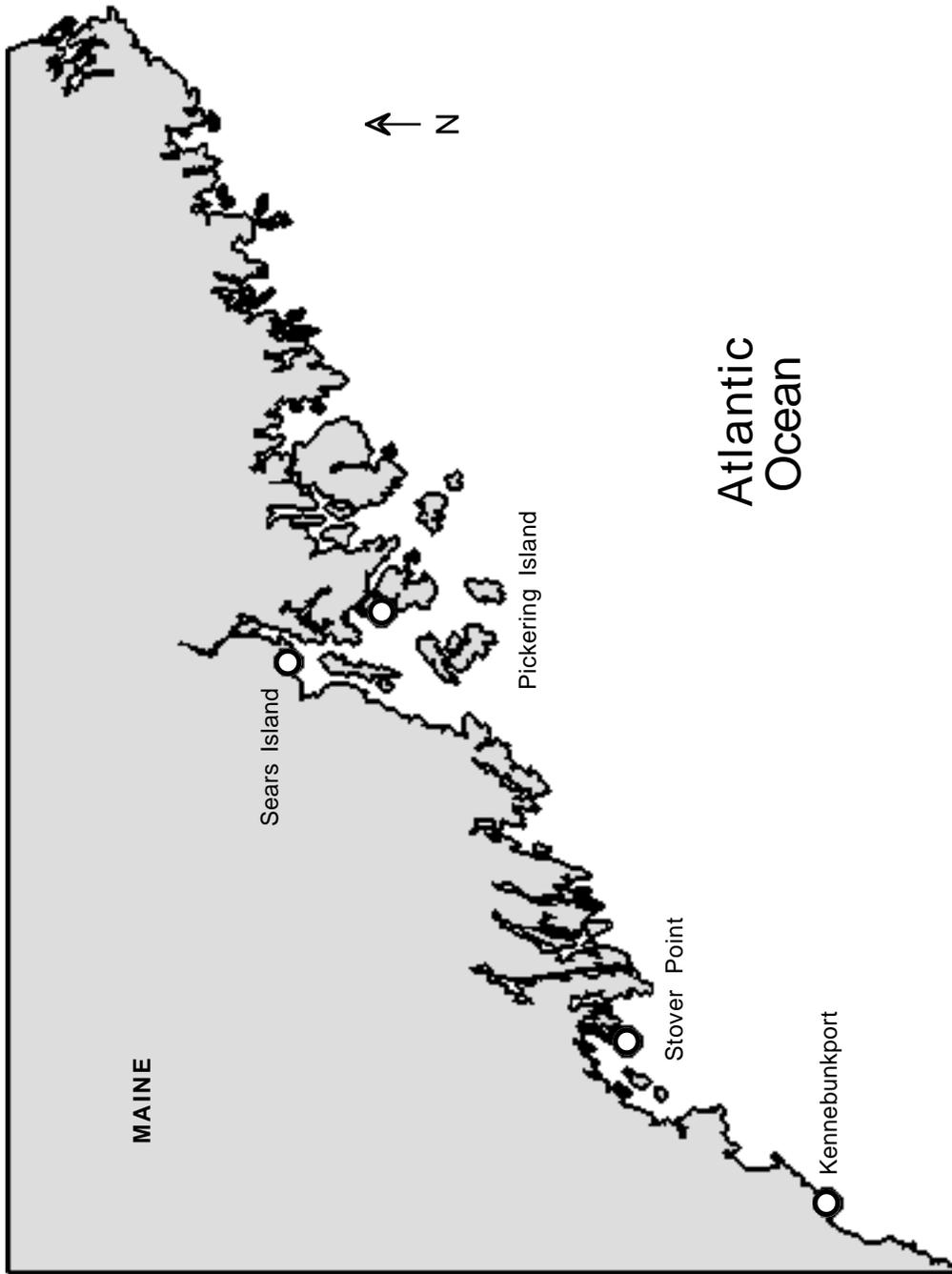


Figure 1. NS&T Mussel Watch sites in Maine.

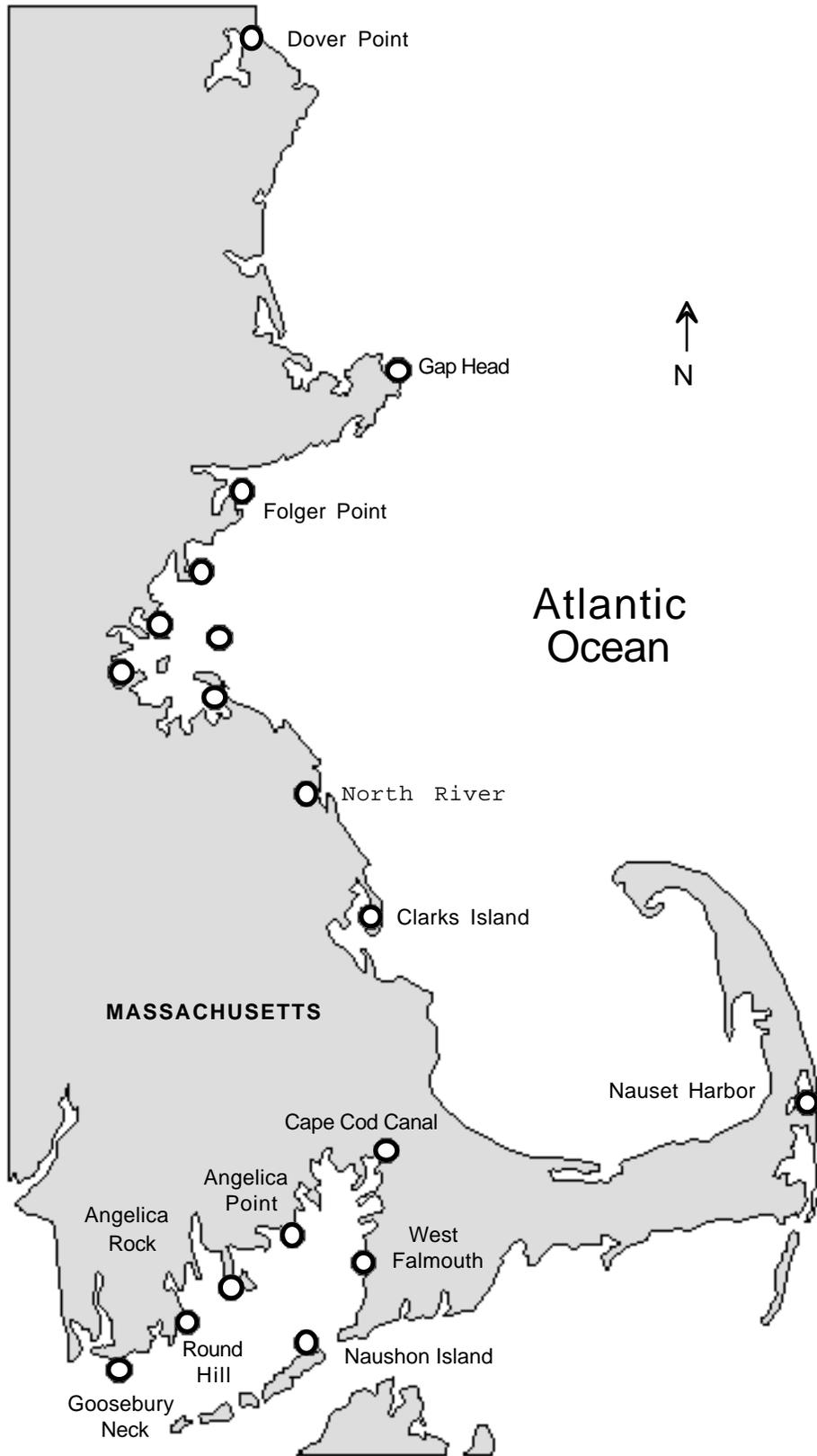


Figure 2. NS&T Mussel Watch sites in Massachusetts and New Hampshire.

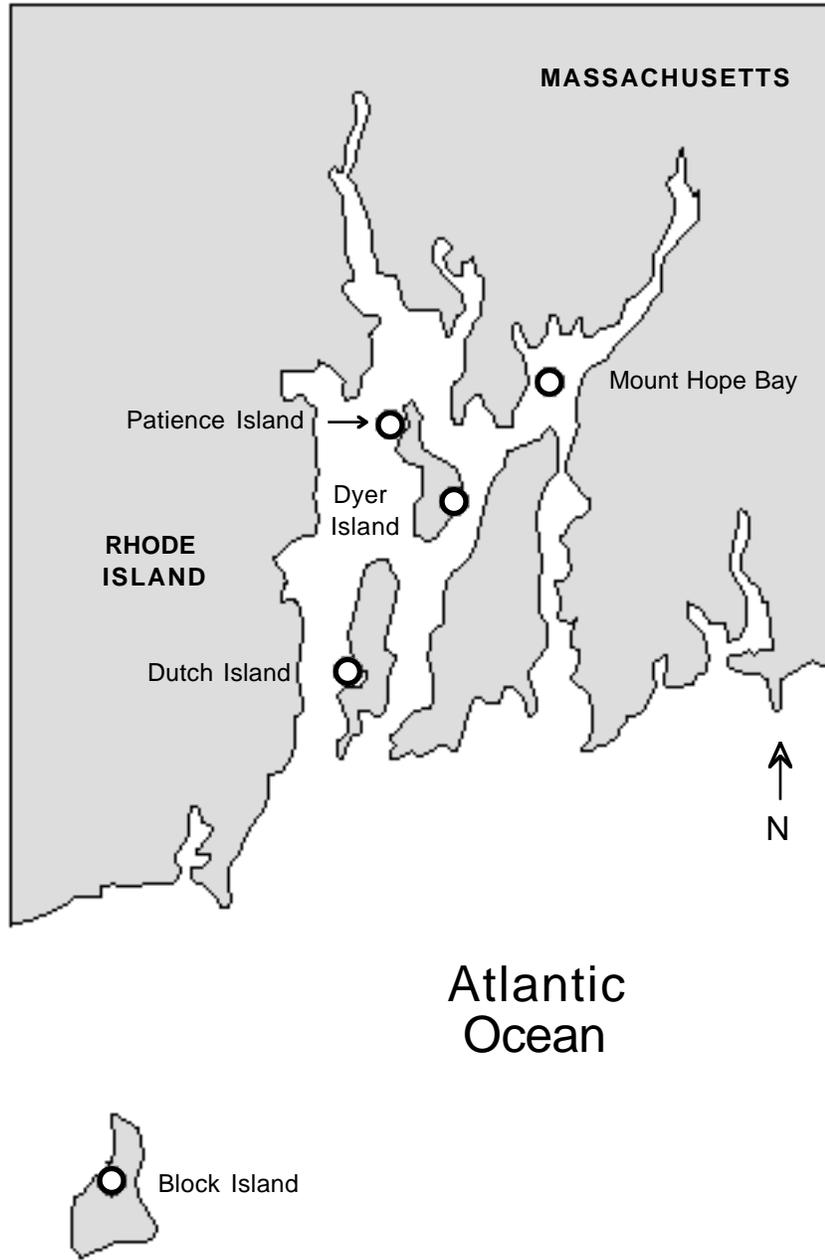


Figure 3. NS&T Mussel Watch sites in Rhode Island.

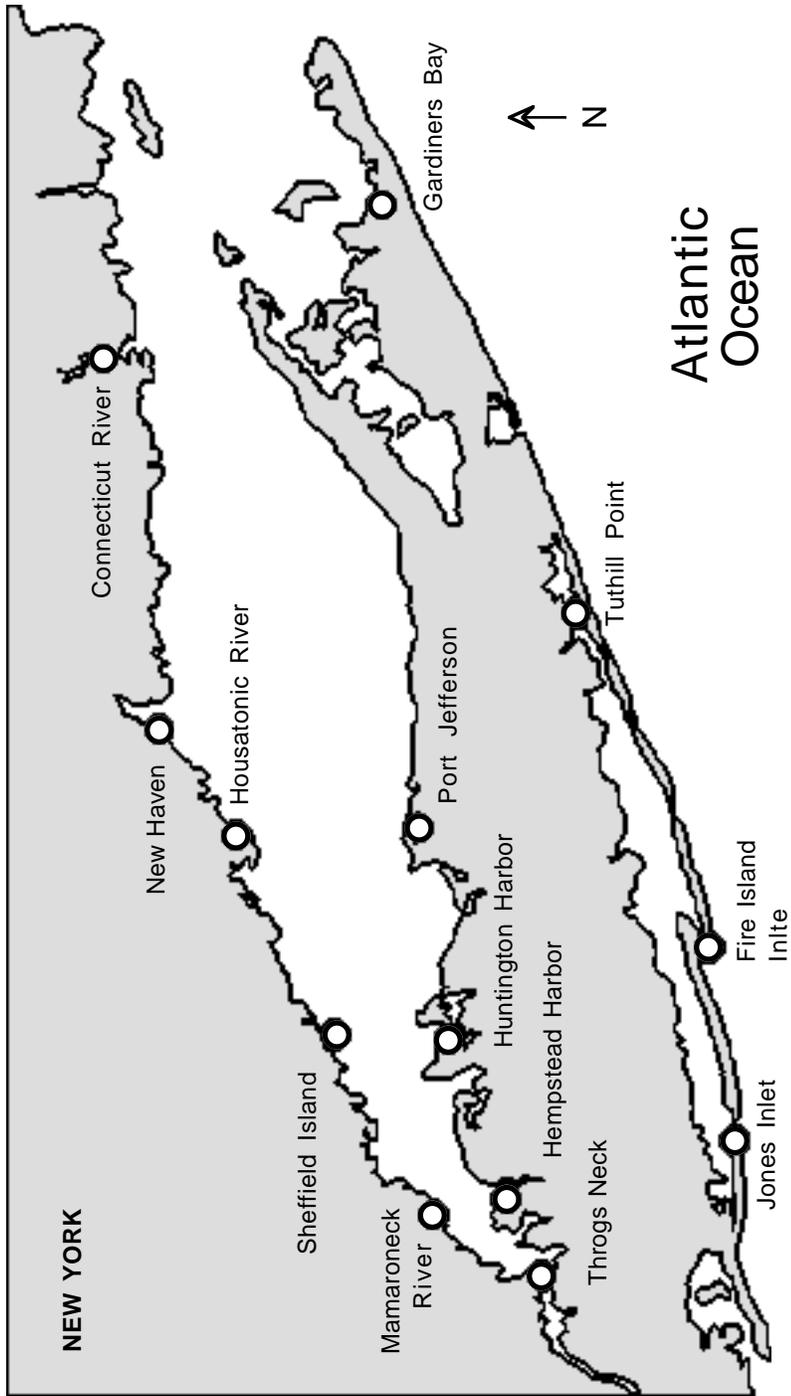


Figure 4. NS&T Mussel Watch sites in the Long Island area.

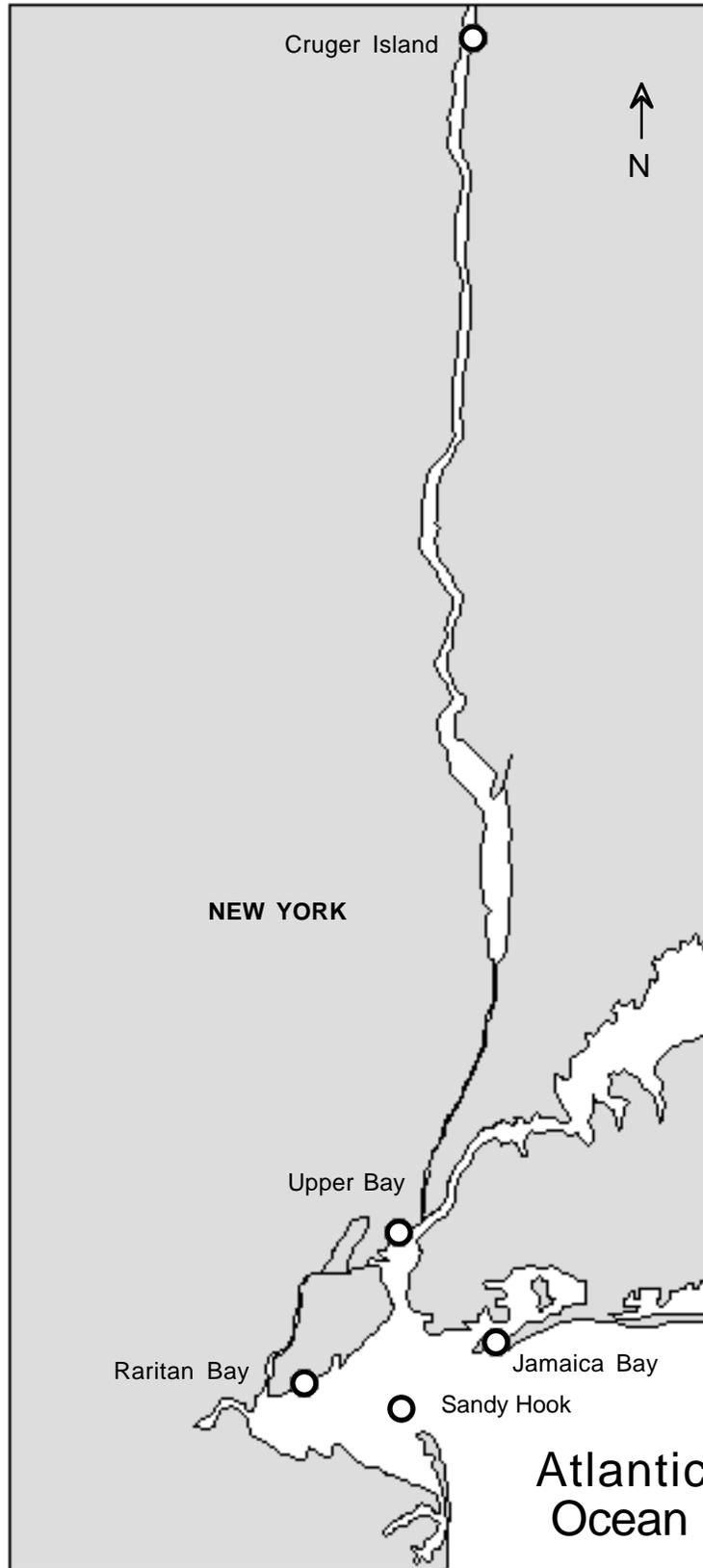


Figure 5. NS&T Mussel Watch sites in the Hudson Raritan Estuary and the Hudson River.

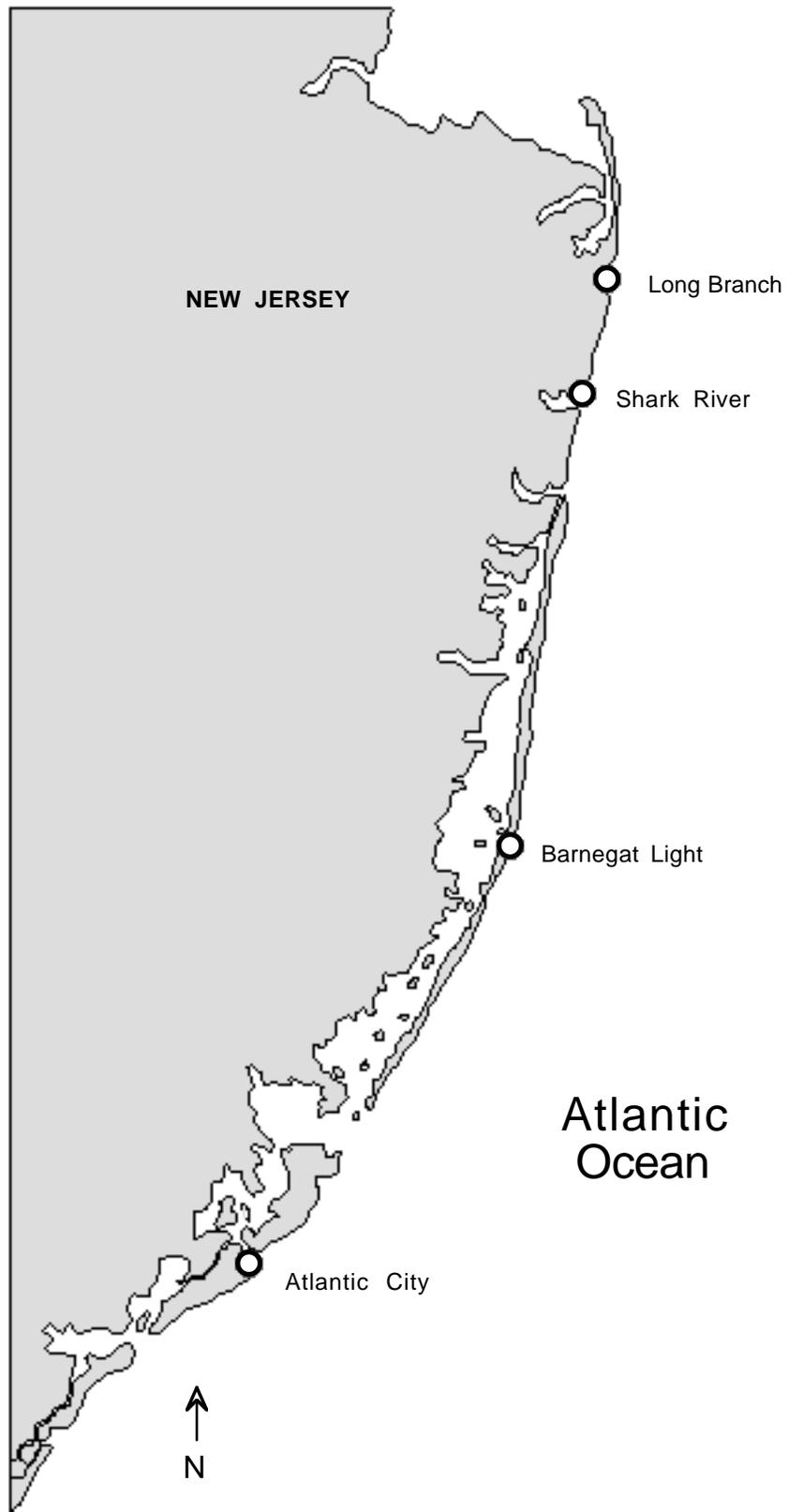


Figure 6. NS&T Mussel Watch sites on the outer New Jersey shore.

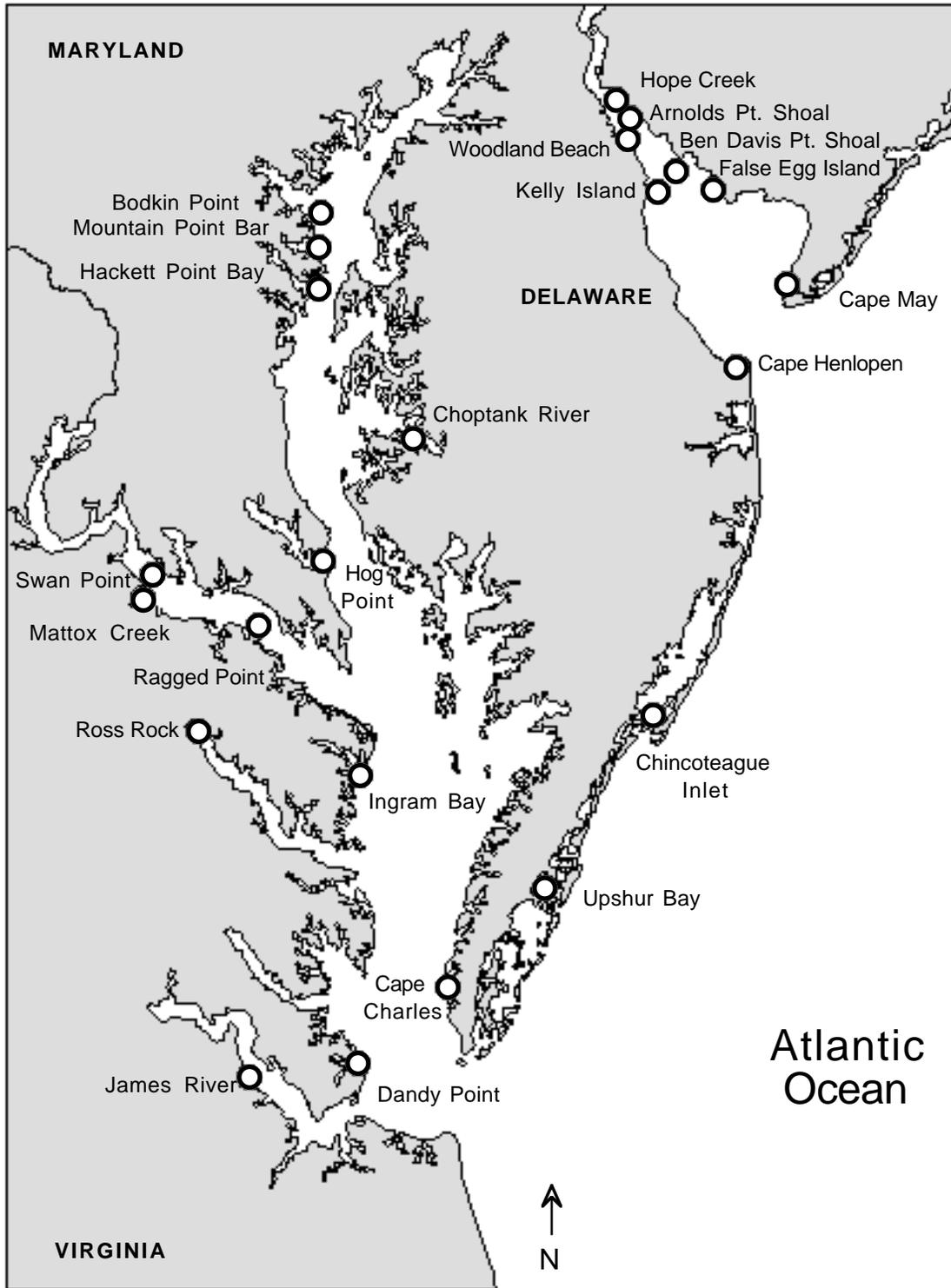


Figure 7. NS&T Mussel Watch sites in Chesapeake and Delaware Bays.

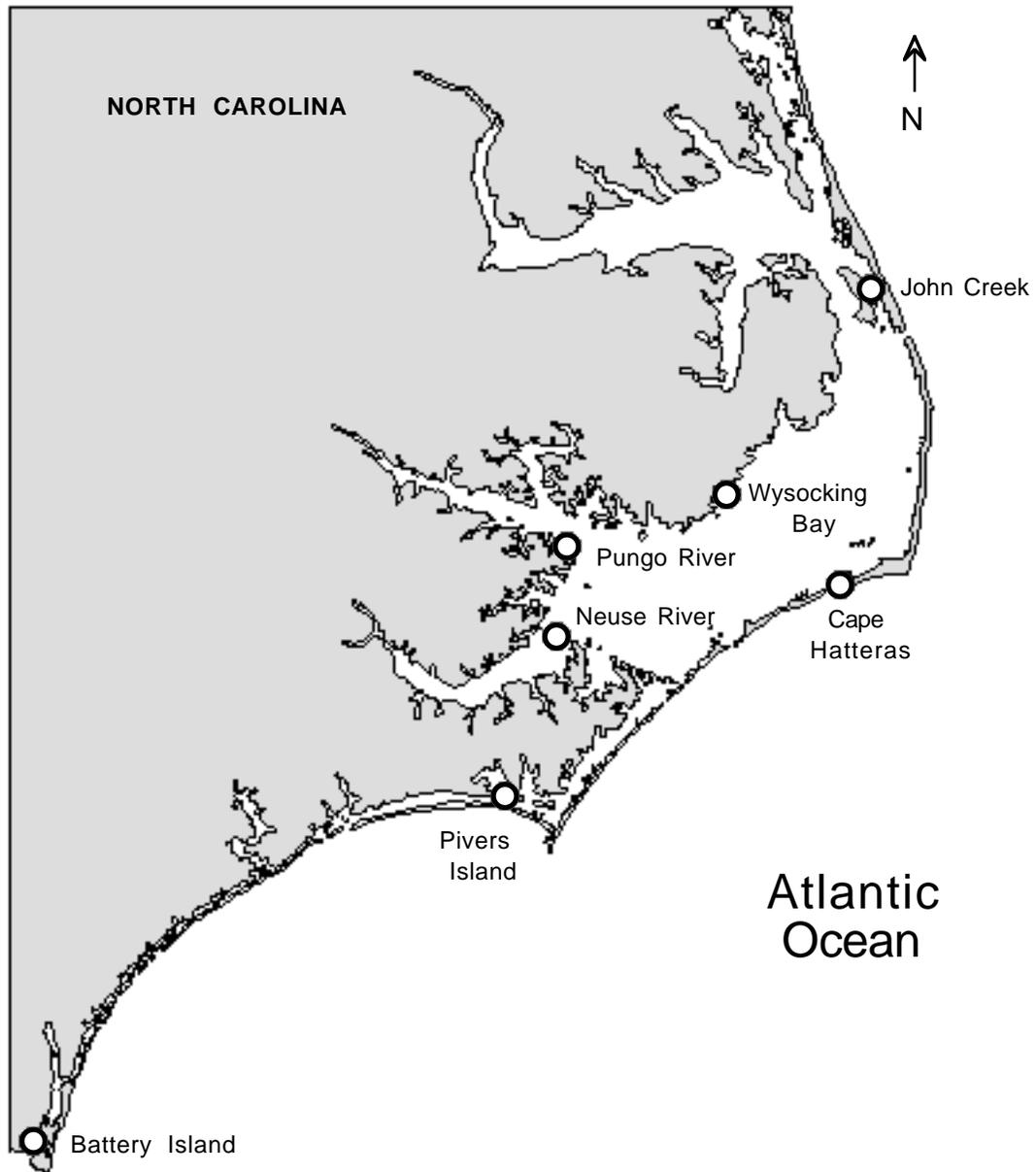


Figure 8. NS&T Mussel Watch sites in North Carolina.

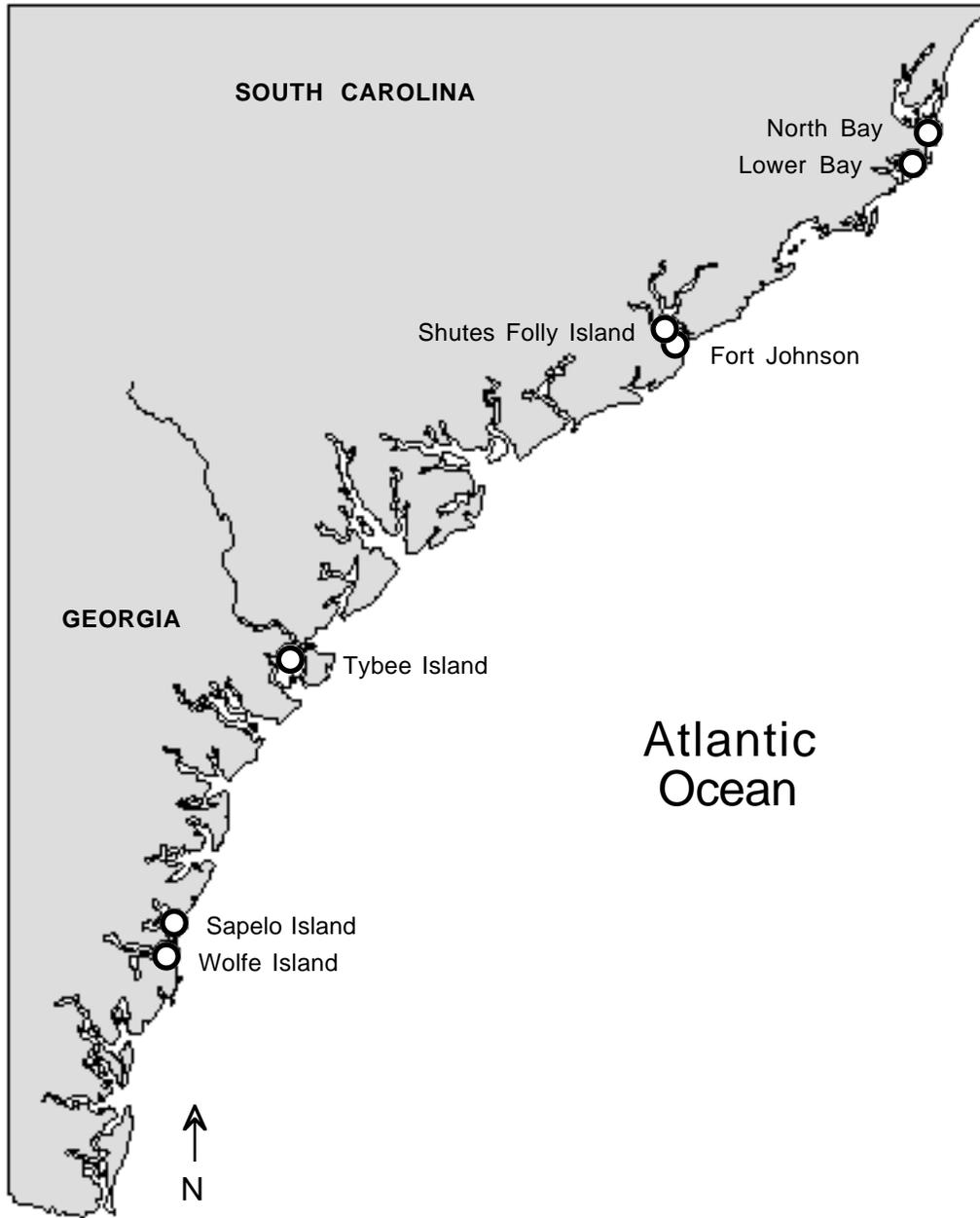


Figure 9. NS&T Mussel Watch sites in South Carolina and Georgia.



Figure 10. NS&T Mussel Watch sites in peninsular Florida.

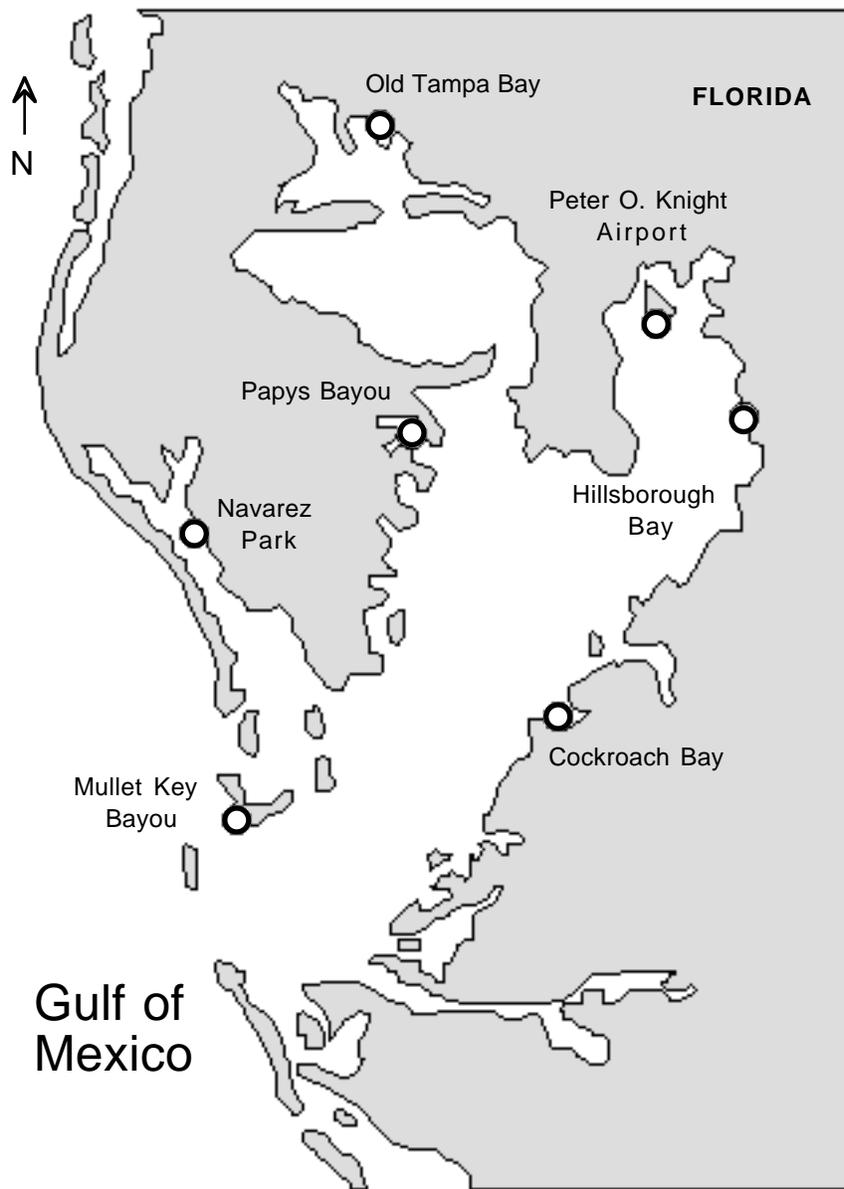


Figure 11. NS&T Mussel Watch sites in Tampa Bay.

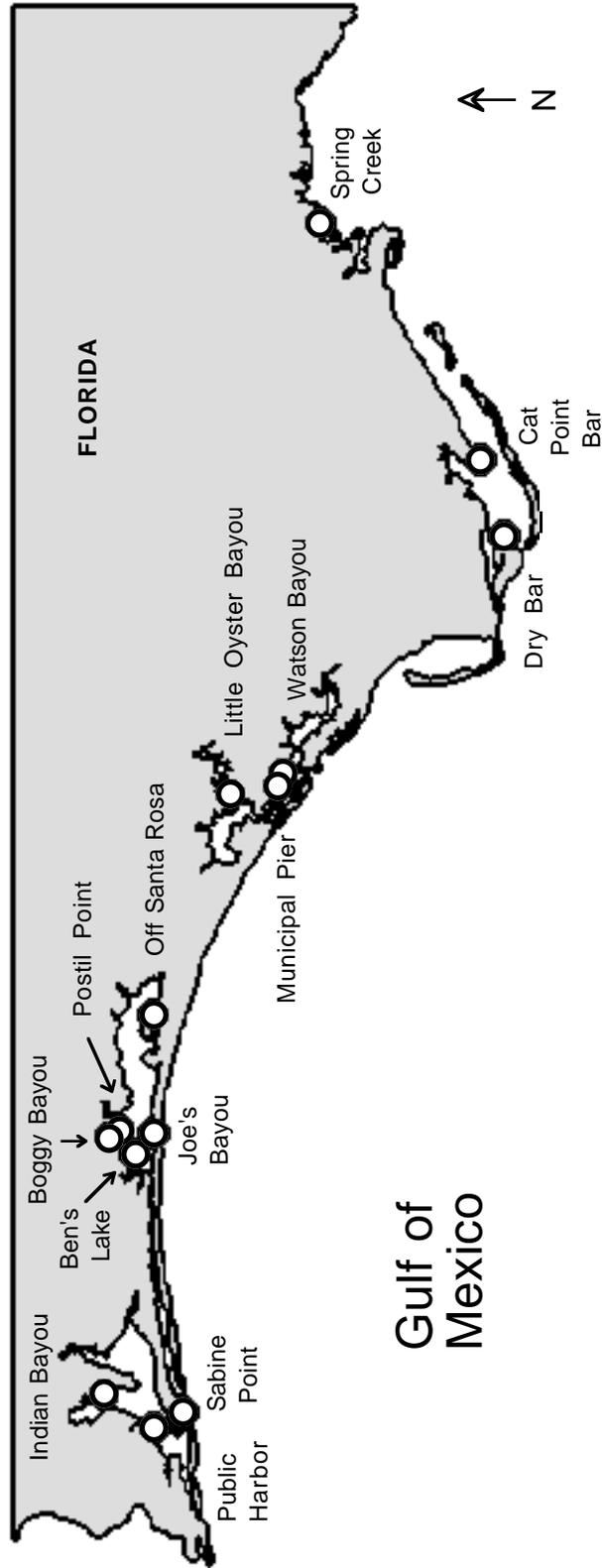
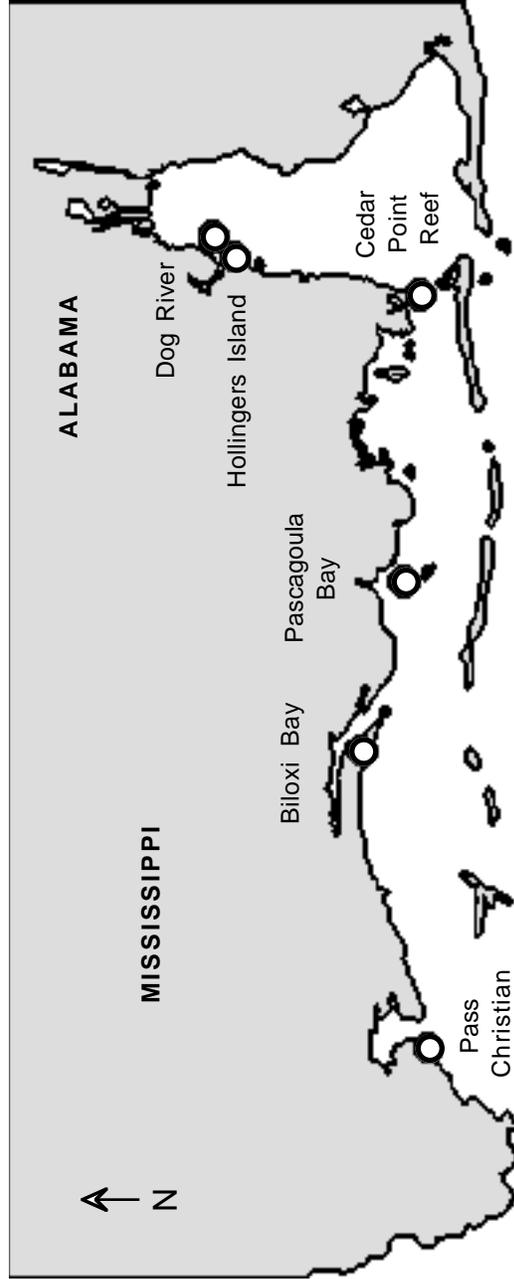


Figure 12. NS&T Mussel Watch sites in the panhandle of Florida.



## Gulf of Mexico

Figure 13. NS&T Mussel Watch sites in Mississippi and Alabama.

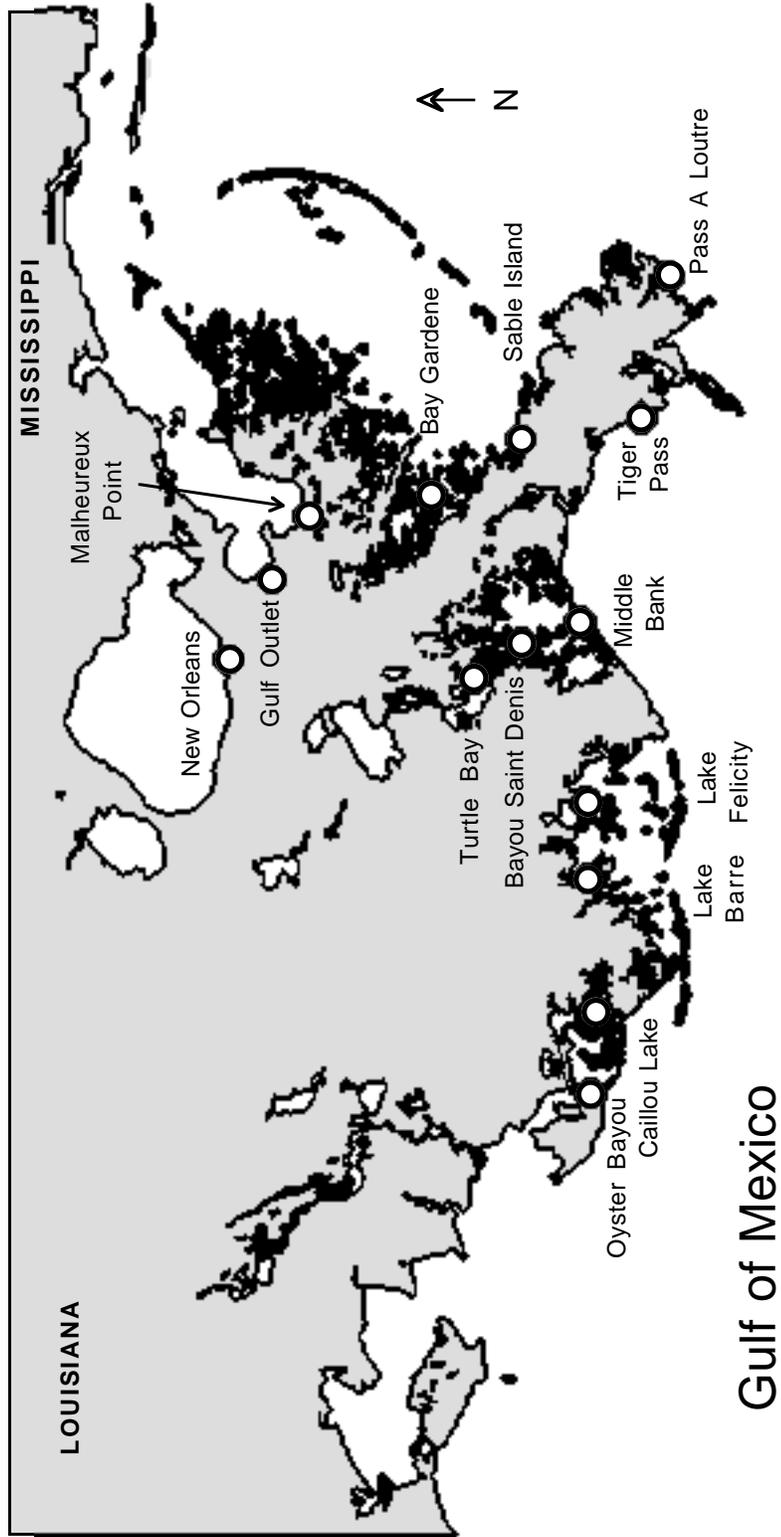


Figure 14. NS&T Mussel Watch sites in Louisiana and Mississippi.

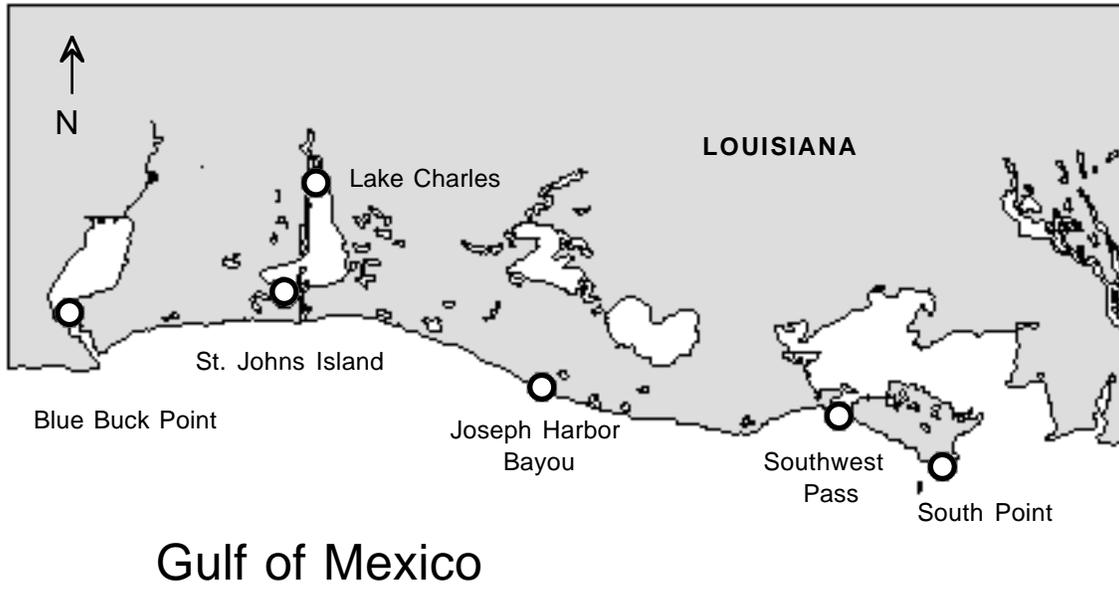


Figure 15. NS&T Mussel Watch sites in western Louisiana.

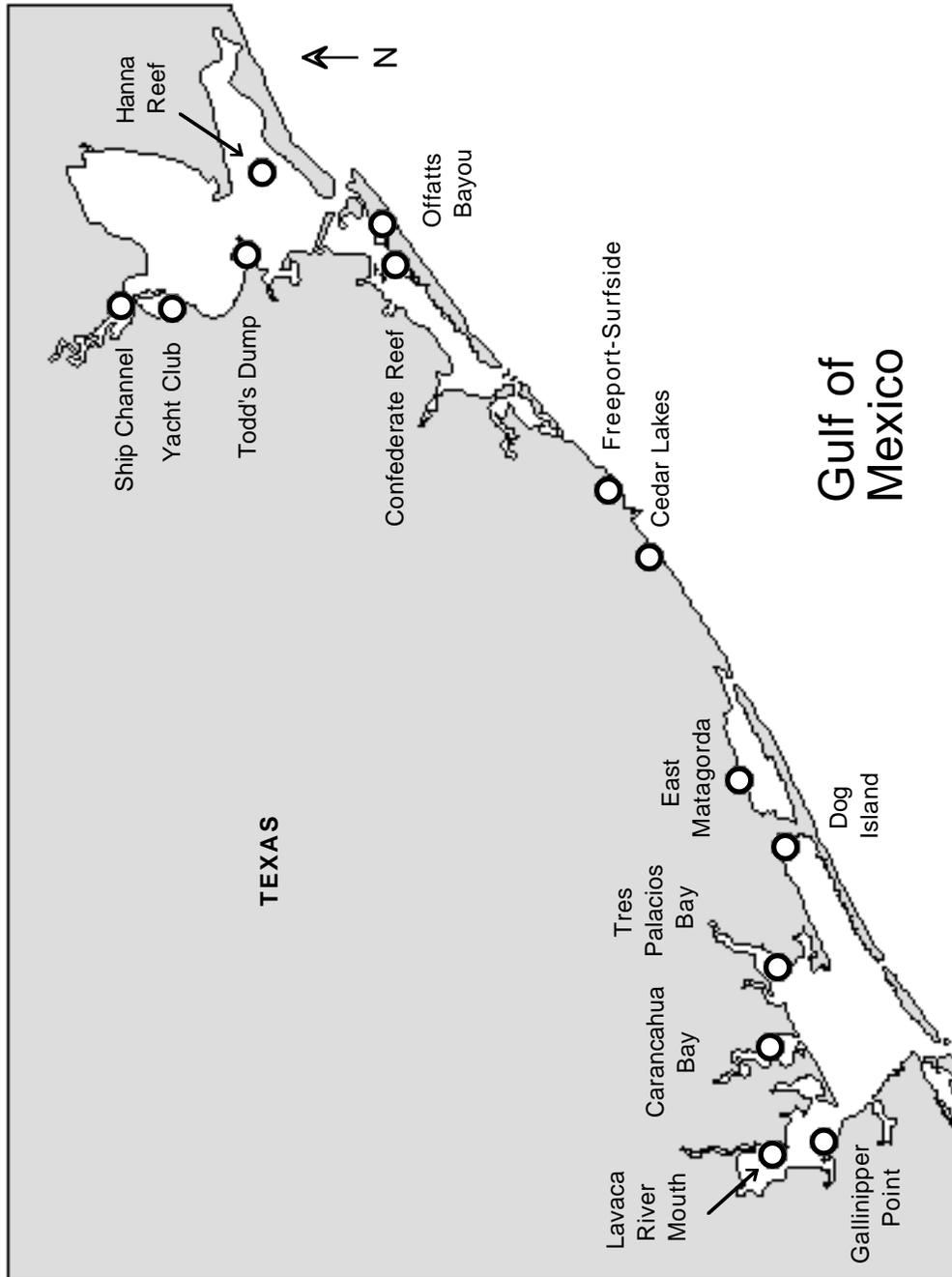


Figure 16. NS&T Mussel Watch sites in southeast Texas.

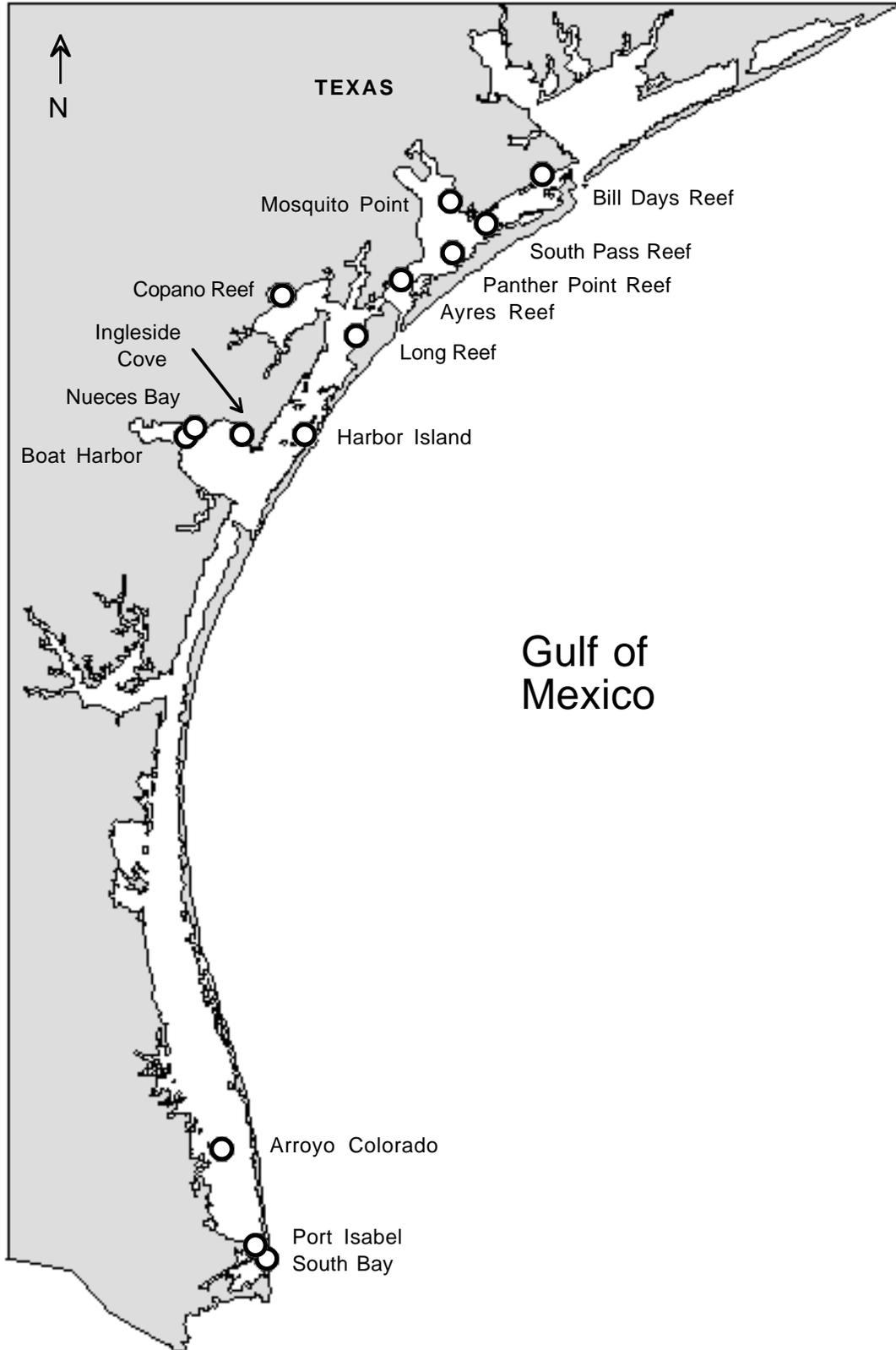


Figure 17. NS&T Mussel Watch sites in southwest Texas.

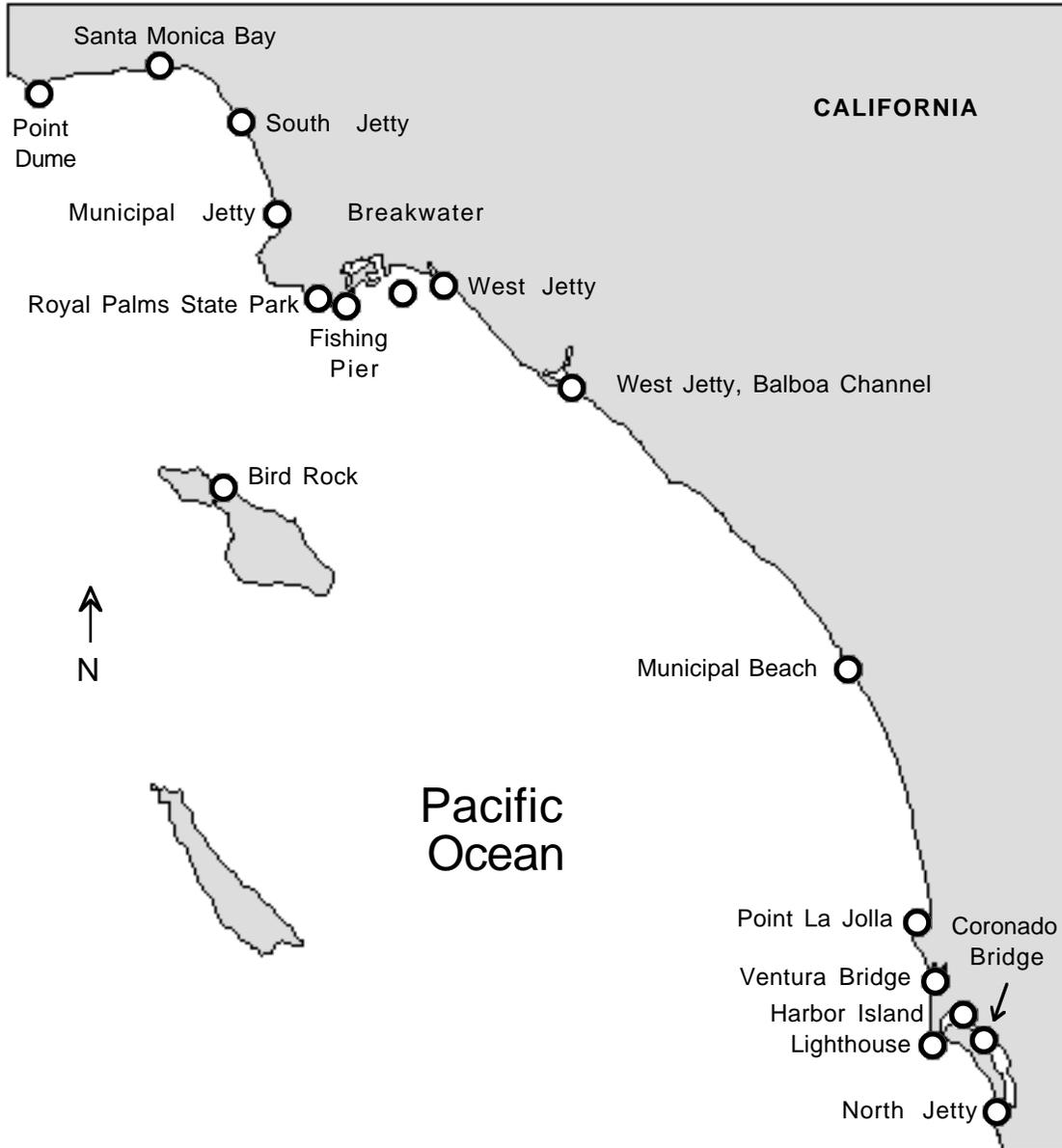


Figure 18. NS&T Mussel Watch sites in southern California.

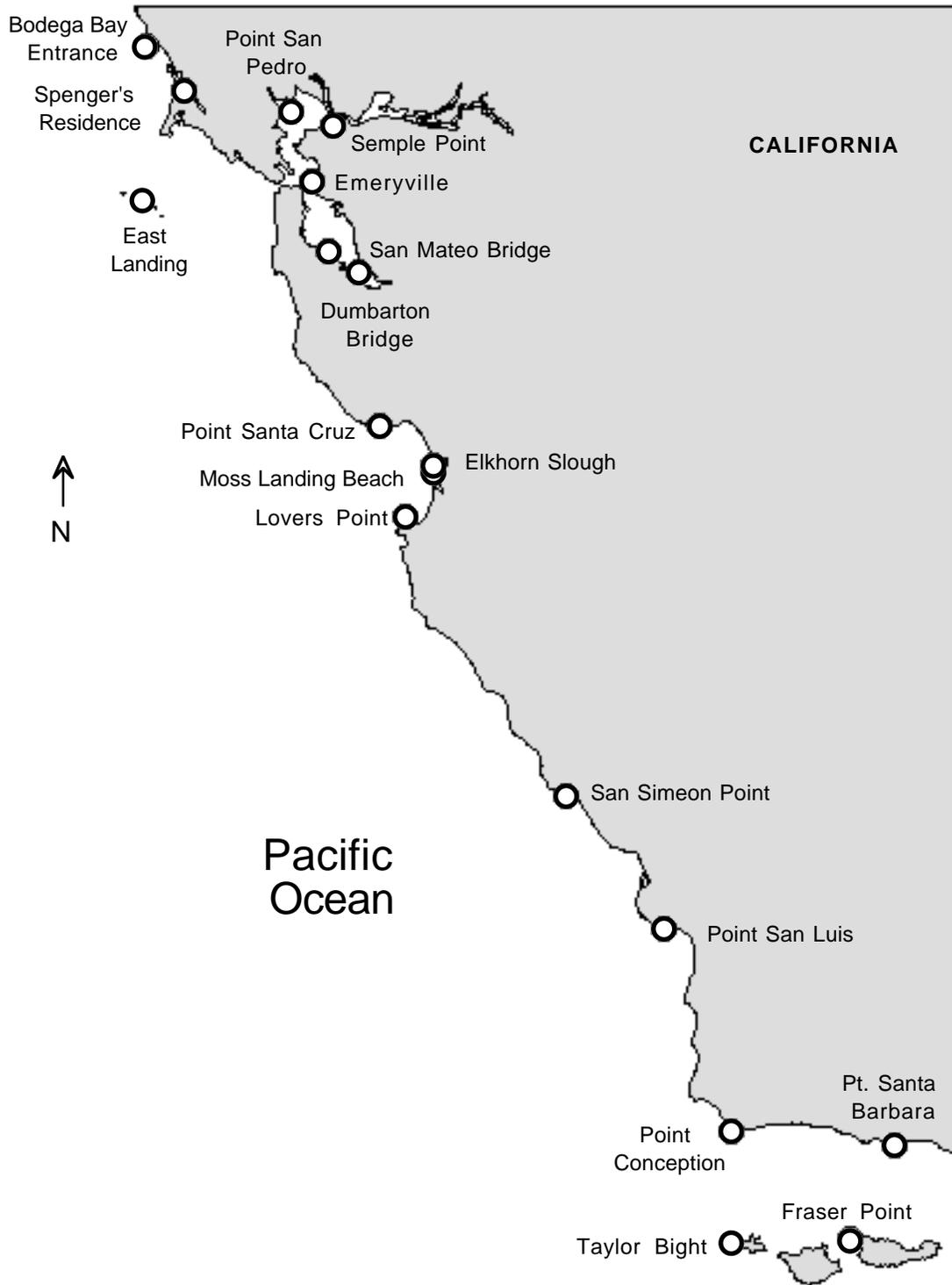


Figure 19. NS&T Mussel Watch sites in central and northern California.

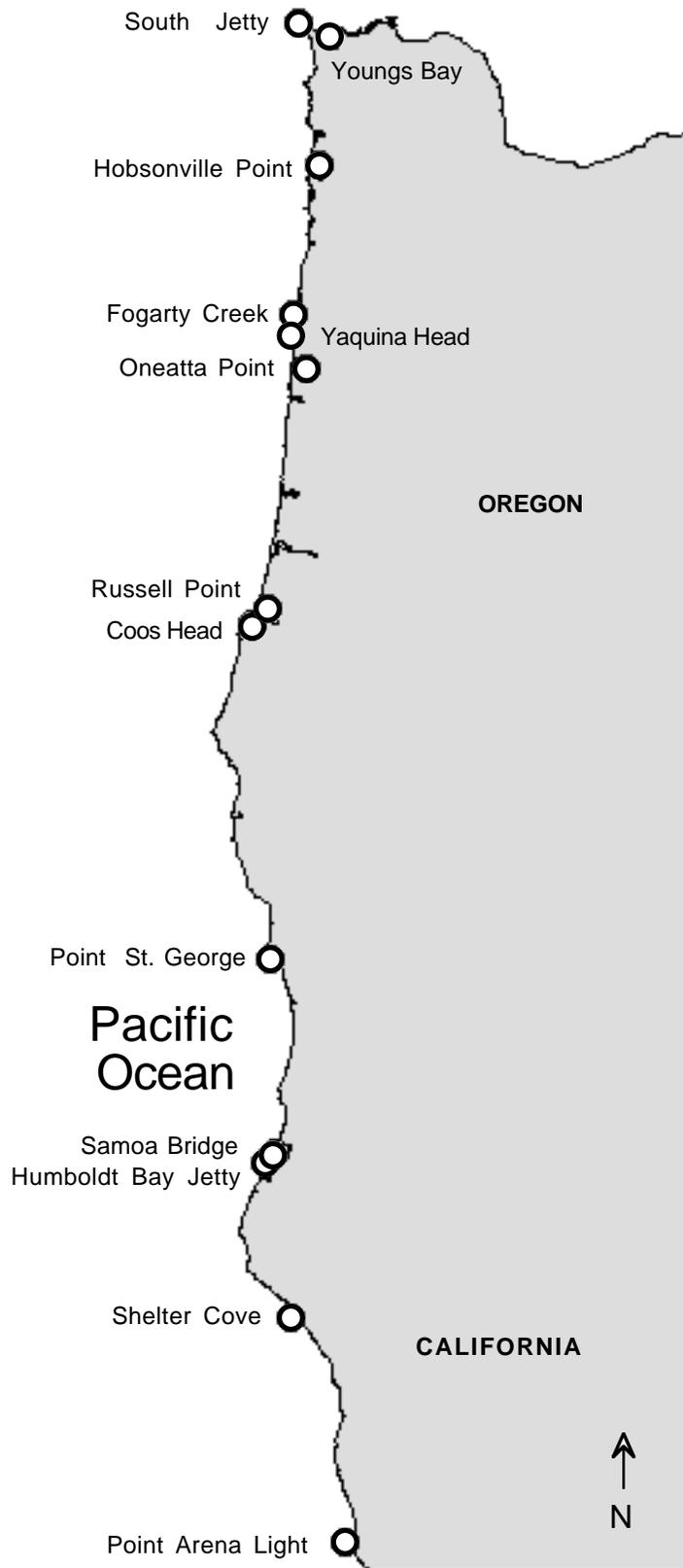


Figure 20. NS&T Mussel Watch sites in northern California and Oregon.

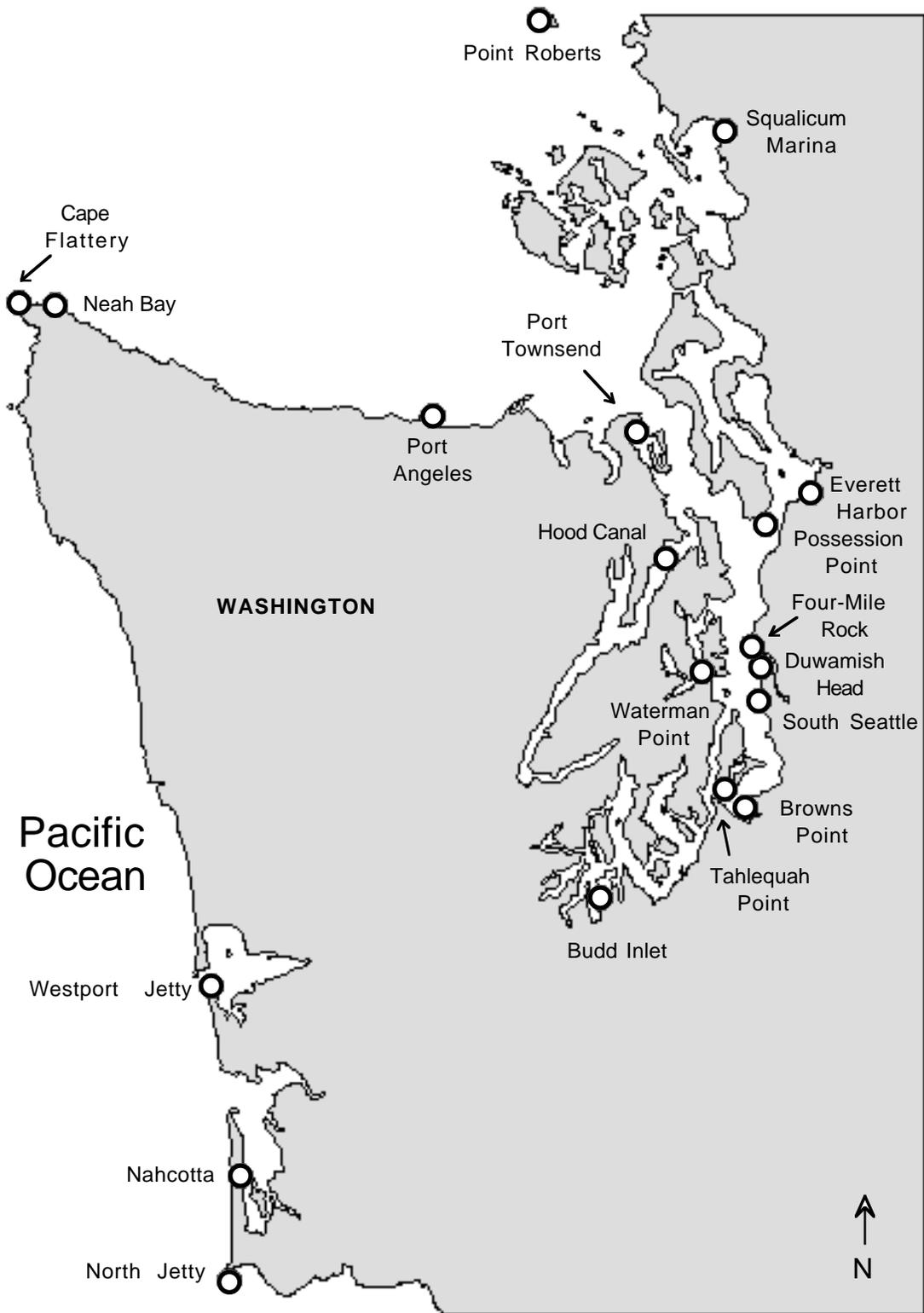


Figure 21. NS&T Mussel Watch sites in Washington.

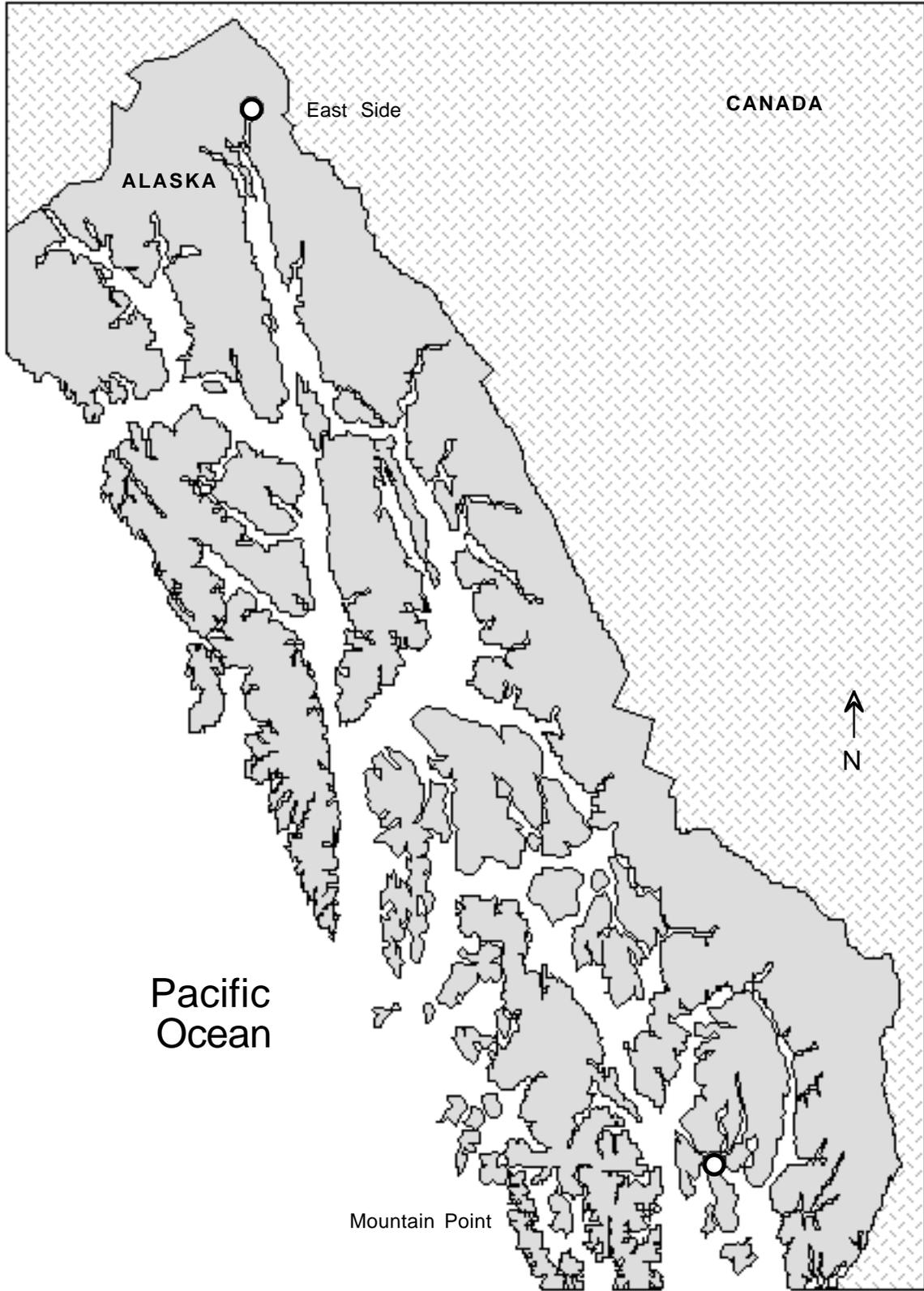


Figure 22. NS&T Mussel Watch sites in the panhandle of Alaska.

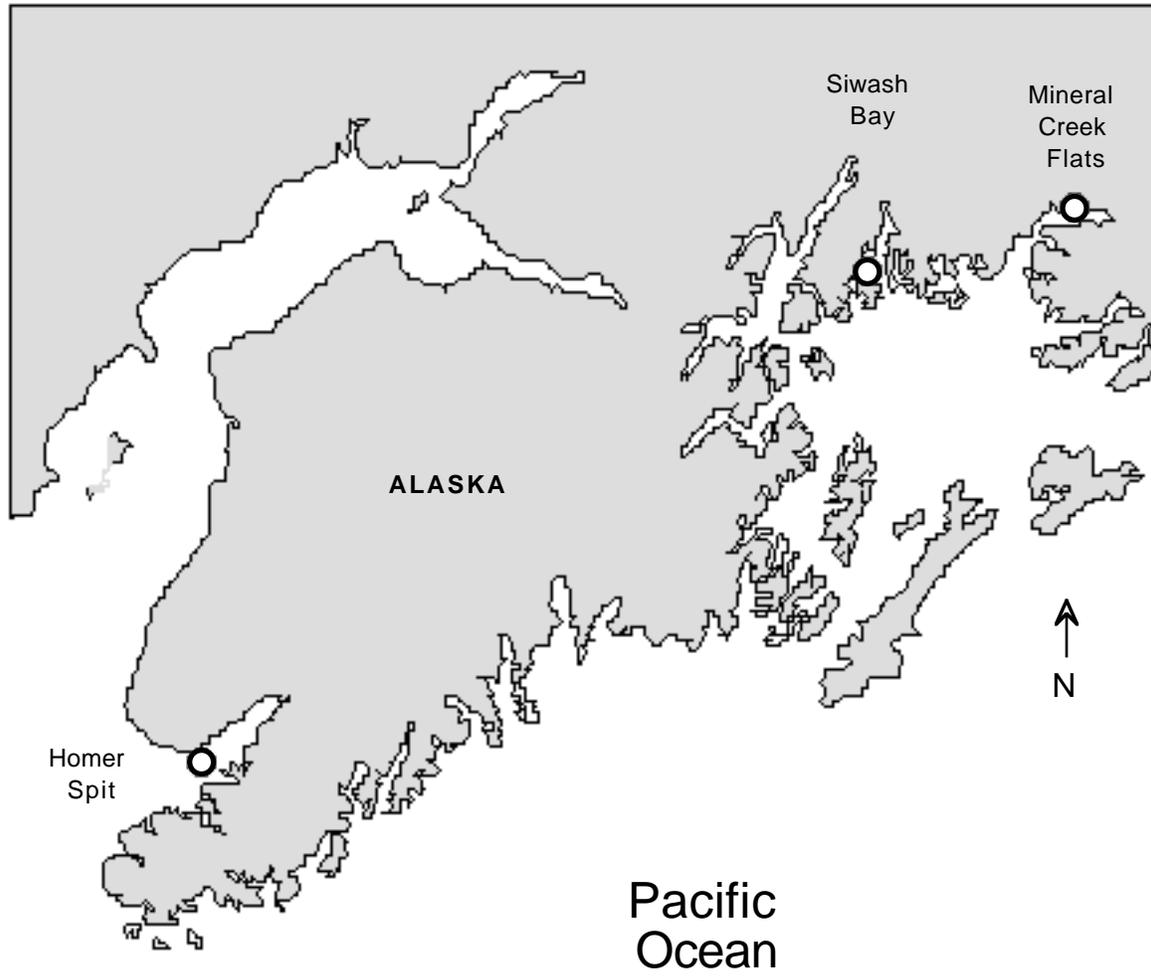


Figure 23. NS&T Mussel Watch core sites in Cook Inlet and Prince William Sound.

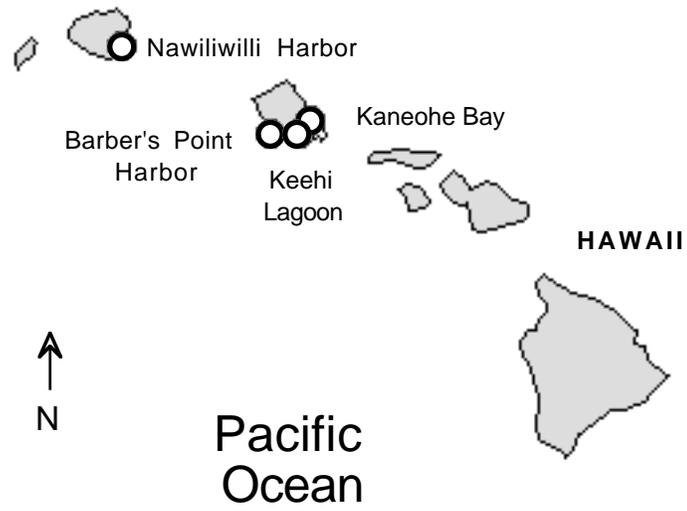


Figure 24. NS&T Mussel Watch sites in Hawaii.



Figure 25. NS&T Mussel Watch sites in Puerto Rico.

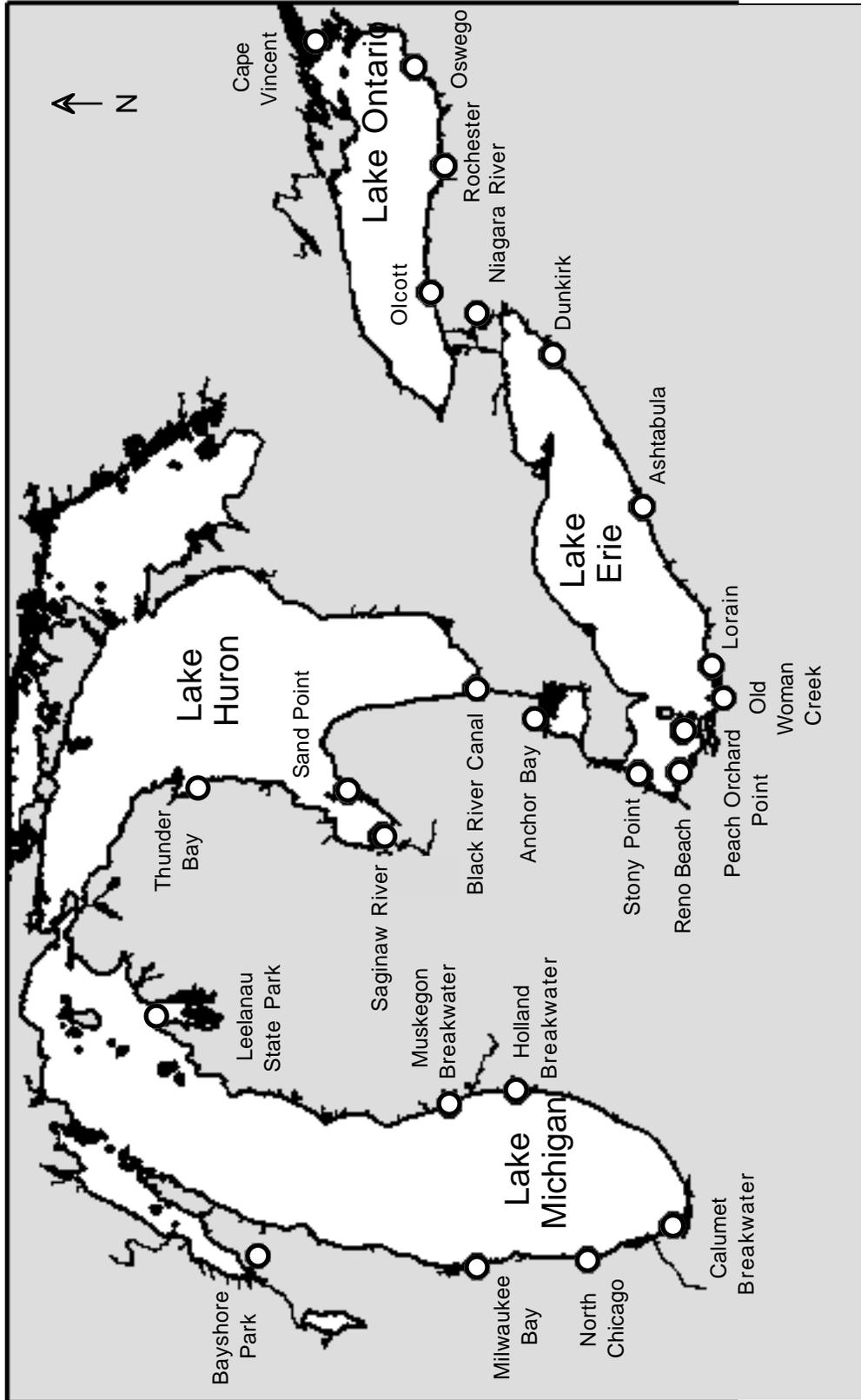


Figure 26. NS&T Mussel Watch sites in the Great Lakes.

## MAINE SITES

**SITE** - PICKERING ISLAND, PENOBSCOT BAY, ME

**SITE CODE** - PBPI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 44° 15.89' N

68° 44.02' W

**LOCATED ON NOAA CHART** - 13309

**SITE ACCESS** - A boat is needed to access Pickering Island in northeast Penobscot Bay. The only workable ramp at low tide in the entire Deer Isle area, is a privately owned stone ramp in Stonington. Follow US 1 east and then head south to Stonington on Hwy. 15. From here, head west by boat down the Deer Isle Thorofare and out into Penobscot Bay, then north to Pickering Island. The run time is around 30 min. Note, the site can also be accessed by boat from Belfast, ME.

**SITE DESCRIPTION** - The site is located in a small cove on the northeast corner of Pickering Island, just south of and opposite Eaton Island. The stations are located in an arc around the cove, with Station 1 in the middle, Station 2 about 25 m to the east (left) and Station 3 about 25 m to the west (right). Mussels were collected by hand. Site is intertidal, +0.5 m MLLW. Mussels at New England sites can be collected that are primarily subtidal by visiting the site at low tide and then collecting mussels below the waterline, using shoulder length protective gloves.

### BIVALVE COLLECTIONS

1995 The whole area is covered with a heavy growth of blue mussels. The site is easily collected at low tide, when the mussels can be picked off the rocks by hand. Dredging would not be an advisable option here, as the bottom is very rocky.

1996 No collection.

1997 Mussels were found, in patches, scattered around the shoreline of the cove.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 No collection.

1997 Sediments were collected at the entrance to the cove. Sediments were a mixture of gravel, sand, and mud.

### SAMPLING METHODS

Mussels - hand

Sediments - Hand held van Veen grab and a Kynar coated scoop

**WATER DEPTH** - intertidal, 0.5 m MLLW  
sediments, 5 m

**SITE** - SEARS ISLAND, PENOBSCOT BAY, ME

**SITE CODE** - PBSI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 44° 27.40' N

68° 52.99' W

**LOCATED ON NOAA CHART** - 13309

**SITE ACCESS** - This site is a relatively easy one to sample at low tide, being accessible on foot. Head east from Searsport on US Hwy. 1, and travel for 2 mi past the Belfast Motor Inn (on your right) and over the Long Cove bridge, turn right (south) onto the road leading to Kidder Point and Sears Island. Cross over the causeway and park on the southwest side.

**SITE DESCRIPTION** - The site is located just to the west of the south end of the causeway, on the extensive mudflat. Station 1 is about 100 m west of the south side road causeway, Station 2 is 50 m north of Station 1 and Station 3 is a further 50 m to the north. This site must be worked at low tide, because a dredge would snag and hang up on the numerous rocks in the area. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 The whole area was covered with a dense population of mussels.
- 1996 No collection.
- 1997 Extensive mussel population still evident.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Fine grained sediments were collected just off the mussel collection site, slightly to the center of Long Cove, in 3 m of water.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and a Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 3 m

**SITE** - STOVER POINT, MERRICONEAG SOUND, ME

**SITE CODE** - MSSP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 43° 45.47' N

69° 59.86' W

**Sediment site center** - 43° 45.50' N

69° 59.79' W

**LOCATED ON NOAA CHART** - 13290

**SITE ACCESS** - This site can be easily accessed by vehicle, and is best sampled at low tide. From US Hwy. 1, turn right (south) onto Hwy 123 and travel about 12 mi south to the Harpswell Neck Fire Station (on the right hand side of the road). From here, go on for another 1.2 mi and turn left onto Stover Cove Rd., then right onto Stover Point Rd. Follow the road for about half a mile to Stover Point.

**SITE DESCRIPTION** - The site is located on a spit at Stover Point in Harpswell Sound, just opposite the C "5" green can buoy at the northernmost tip. Station 1 is at the northernmost tip on the east side of the spit, Station 2 is 30 m further south with Station 3 an additional 30 m to the south. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 Mussels of all sizes were abundant throughout the entire area. Mussels were not dredged for because there were numerous large rocks that would snag the dredge.

1996 No collection.

1997 Mussels were not as numerous as in 1995, though on distinct bed of mussels did exist.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Fine grain sediments were collected approximately half a Km from the mussel site in 10 m of water.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and a Kynar coated scoop

**WATER DEPTH** - intertidal, +0 m MLLW  
sediments, 5 m

**SITE** - KENNEBUNKPORT, CAPE ARUNDEL, ME

**SITE CODE** - CAKP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 43° 20.72' N

70° 28.46' W

**TARGET SPECIES** - *Mytilus edulis*

**LOCATED ON NOAA CHART** - 13286

**SITE ACCESS** - This site is accessible by vehicle, and can only be sampled at low tide. From I-95 traveling north into Maine, take Exit 3 and head towards Kennebunkport on Hwy. 35 (south). Drive into Kennebunkport and over the Kennebunk River, then turn right onto Ocean Ave. in the town square. Follow Ocean Ave. to the parking lot, at the base of the jetty, at the mouth of the river (on the right hand side of the road).

**SITE DESCRIPTION** - The eastern breakwater on the Kennebunk River forms a small cove in the shoreline. The nominal center of the site is here. Mussels were collected by hand where the jetty (inside) granite blocks meet the granite boulders. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 Mussels were attached to the underside of the rocks and in the numerous crevices.  
1996 No collection.  
1997 Mussels were numerous along the subtidal rocks.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0 m MLLW

## NEW HAMPSHIRE SITE

**SITE** - DOVER POINT, GREAT BAY, NH

**SITE CODE** - GBDP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 43° 07.24' N

70° 49.59' W

**LOCATED ON NOAA CHART** - 13285

**SITE ACCESS** - From Interstate 95 in the Portsmouth, NH area turn onto Route 4 to Dover, NH. Immediately after crossing the large bridge that goes over the northern most part of Great Bay look for signs for Hilton State Park. The site and State Park are under the northern end of the bridge.

**SITE DESCRIPTION** - The site was established in 1997 just North of the Great Bay National Estuarine Research Reserve. The site is located on the southeast part of Dover point. Station samples were located around a point of land projecting into the Piscataqua River. Dover Point is at the confluence of Great Bay and the Piscataqua River.

### **BIVALVE COLLECTIONS**

1997 Mussels were found at the low water line amongst the rocks of Dover Point. The mussels were under aquatic plants. Mussels were found adhering to the rocks in groups of usually fewer than 5 mussels.

### **SEDIMENT COLLECTIONS**

1997 No collection.

### **SAMPLING METHODS**

Mussels - hand

**WATER DEPTH** - intertidal, 0 m MLLW

## MASSACHUSETTS SITES

**SITE** - GAP HEAD, CAPE ANN, MA

**SITE CODE** - CAGH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 39.46' N

70° 35.84' W

**TARGET SPECIES** - *Mytilus edulis*

**LOCATED ON NOAA CHART** - 13279

**SITE ACCESS** - This site is best sampled at an extremely low tide. From I-95, take the Hwy. 128 exit and go north towards Gloucester. At the Blackburn Rotary (circle), take the Gloucester-Rockport exit and then turn left at the second set of lights which takes one onto Bass Ave. Follow the road for about a mile to Amelia's Sub-Shop and then proceed left for another 1.7 mi to Thatcher Rd. Turn left here and follow the road as it bears left into South St. for an additional 0.8 mi to Marmon St. Turn right onto Marmon and the site is a further 0.5 mi down the road.

**SITE DESCRIPTION** - The site is located in a small cove just south of Gap Head, and west of Straitsmouth Island. A short distance to the northwest there is a radio tower which is a good reference point. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

### BIVALVE COLLECTIONS

- 1995 Only one small patch of mussels was found after an extensive search.
- 1996 No collection.
- 1997 Mussels were only found in gravel patches, between rocks, along a very narrow strip exposed at dead low tide. The mussels were very small (~1-2 inches).

### SEDIMENT COLLECTIONS

- 1995 No collection.
- 1996 No collection.
- 1997 Samples were collected from a small boat, approximately 10m from shore at 42° 39.46' N, 70° 35.82' W, by lowering the grab onto small patches of sediment between rocks and boulders. However, this sediment was probably too sandy for analysis. The bottom is rocky out and beyond 0.5 miles from the nominal site center.

### SAMPLING METHODS

- Mussels - hand
- Sediments - Young modified van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 2 m

**SITE** - FOLGER POINT, SALEM HARBOR, MA

**SITE CODE** - SHFP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 30.81' N

70° 50.65' W

**LOCATED ON NOAA CHART** - 13274

**SITE ACCESS** - Access to this site is gained by foot, and it can only be sampled at low tide. Follow Hwy. 1A from Boston north towards Salem, and take the Hwy. 114 exit heading east (to the right). Follow the road for 1.1 mi to a set of lights, and turn left onto Westshore. After 2.4 mi this road turns into and becomes Beacon St. Follow Beacon St. to the second small cove on the left

**SITE DESCRIPTION** - The site is located in a small cove on the Marblehead Peninsula. Mussels were collected by hand. Use the concrete steps near the road to access the mudflats. Mussels were collected on the rocky point away from the boat facilities. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 There was an abundance of mussels of all sizes throughout the entire area.

1996 No collection.

1997 Mussels were abundant.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected within the cove, at low tide using a Kynar coated sediment scoop.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - Kynar coated sediment scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 0 m

**SITE** - NAHANT BAY, MASSACHUSETTS BAY, MA

**SITE CODE** - MBNB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 25.19' N

70° 54.43' W

**LOCATED ON NOAA CHART** - 13275

**SITE ACCESS** - This site is easily accessed by foot at low tide. Follow Nahant Rd. out to the end of the Nahant Peninsula, where there is an old "Nike" missile base/bunker. There is now a N.E. University Marine Science Center there. The site is to the left of the carpark at the end of the road, on Canoe Beach - which is just to the south of Castle Rock.

**SITE DESCRIPTION** - The nominal center of the site is located on Canoe Beach, which is monitored by the Research Center. The gravel beach lies at the end of a small cove with rock cliffs on either side. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 There were a large number of small mussels at the low water mark, attached to the underside and in the rock crevices.

1996 No collection.

1997 Mussels could not be found along the gravel beach, but were collected along the right bank of cliffs, at low tide, below water within rock crevices.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 5 m

**SITE** - DEER ISLAND, BOSTON HARBOR, MA

**SITE CODE** - BHDI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 21.44' N

70° 58.38' W

**LOCATED ON NOAA CHART** - 13270

**SITE ACCESS** - This site is on the Deer Island shoreline, and is easily accessed by foot at low tide. From I-93 in Boston, head north and take Exit 24 onto Hwy. 1A going north towards the Callahan Tunnel and Logan Airport. Turn right onto Hwy. 145 and drive towards Chelsea/Winthrop. Turn right onto Saratoga and right again onto Pleasant and drive into Winthrop (you are still on Hwy. 145). At the stop sign in Winthrop, turn right and drive past the Winthrop Yacht Club and out to Deer Island. There is a good public boat ramp just past the Yacht Club. The road, once on Deer Island, bears to the left. Take the second turn to the right onto Otis St. The site is at the end of Otis St. at the seawall.

**SITE DESCRIPTION** - The nominal site center is located around an old pier structure, of which only the wooden pilings remain. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 The entire area was covered with mussels of all sizes, growing on the pebble beach, rocks and pilings.
- 1996 No collection.
- 1997 Mussels of all sizes were abundant and were collected away from the pier. Mussels were collected below water at low tide, 50 m out from the high water mark, as the shoreline has a shallow slope and areas nearer to shore were exposed for a long period.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected by boat, in approximately 50 m from the nominal site center on the shoreline. The bottom was rocky and the grab was visually spotted over muddier patches. Sediments were a silty sand with shells.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 2.5 m

**SITE** - DORCHESTER BAY, BOSTON HARBOR, MA

**SITE CODE** - BHDB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 18.13' N

71° 02.18' W

**LOCATED ON NOAA CHART** - 13270

**SITE ACCESS** - This site is easily sampled at low tide, with only a short walk from the car park to the mudflat. Take Exit 12 off I-93 and head south down Hwy. 3A towards Quincy. At the lights, turn left onto Squantum Rd. and drive to the entrance into Marina Bay. Turn left into the marina and follow the road to the rotary then take the right exit. Take the first road to the left, Haul Rd., and drive to the ferry carpark. Cross the carpark and go through the gate to the left, then follow the track for about 200 m to the site.

**SITE DESCRIPTION** - The site is located on the Dorchester Bay mudflats, some 300 m west of the Nantucket Lightship and about 75 m north of the old iron seawall. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 The mudflat supports a large population of mussels of all sizes. Care should be taken while sampling, because the tide comes in very fast and the sediments are very soft.
- 1996 No collection.
- 1997 Small clumps of mussels were scattered throughout the area in very soft sediment.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected by boat, but in the future could be taken on foot at low tide. The area near the nominal site center has a shallow slope with many large rocks and if a boat is used should only be approached at high tide. Sediments were collected near 42° 18.26' N, 71° 02.18' W and were a dark gray clay with sand and shell hash.

#### **SAMPLING METHODS**

- Mussels - hand
- Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 1 m

**SITE** - HINGHAM BAY, BOSTON HARBOR, MA

**SITE CODE** - BHHB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 16.56' N

70° 53.00' W

**LOCATED ON NOAA CHART** - 13270

**SITE ACCESS** - Take Exit 12 off I-93 and head south on Hwy. 3A through Neponsett and Quincy. Follow Hwy. 3A to Hingham, then north towards Hull along the peninsula. After the first short causeway, turn left onto Water Edge Rd. and follow it to the stop sign. Turn left and go to the small green house (#239) at the water's edge.

**SITE DESCRIPTION** - The site is located on the one side of a small channel leading into Weir River, opposite the red nun buoy "4". Station 1 is located on the beach 50 m to the east of the green house, in front of a light gray house with a white flagpole, Station 2 is in front of the green house and Station 3 is 50 m to the west of the green house at a one meter high boulder on the beach, in front of a two storey white house. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 There was a dense population of mussels of all sizes, all along the pebble and rock beach.
- 1996 No collection.
- 1997 A large population of mussels of all sizes were found at the site and were collected below water near low tide.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected approximately 25 m from the nominal site center on the shore bank. Several grabs were attempted, as some were more sandy than others. Sediments were a gray, silty sand with mussel shells.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 2 m

**SITE** - BREWSTER ISLAND, BOSTON HARBOR, MA

**SITE CODE** - BHBI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 20.59' N

70° 52.70' W

**LOCATED ON NOAA CHART** - 13270

**SITE ACCESS** - The site can only be accessed by small boat in calm weather. There is a good public boat ramp next to the Winthrop Yacht Club, on Deer Island (see Deer Island Site for more information). Care should be taken in negotiating the outer islands in Boston Harbor, because there are numerous rocks and reefs surrounding the islands.

**SITE DESCRIPTION** - The nominal site center is in a small cove on the northeast side of the Outer Brewster Island. Extreme care should be taken here as the swell breaks into the cove, which has numerous subsurface rocks out from the shoreline. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 There were very few mussels to be found in the cove. They were generally small and well attached in the rock crevices.

1996 No collection.

1997 Large mussels were found within rock crevices below water at low tide. The site was accessed from a small skiff launched from a larger vessel. The site should only be approached in calm weather and only at low tide.

#### **SEDIMENT COLLECTIONS**

None

#### **SAMPLING METHODS**

Mussels - hand

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - NORTH RIVER, MASSACHUSETTS BAY, MA

**SITE CODE** - MBNR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 09.62' N

70° 44.55' W

**LOCATED ON NOAA CHART** - 13269

**SITE ACCESS** - This is another site that can only be sampled at low tide, with an easy access by foot. Follow Hwy. 3A south from Hingham towards Scituate, and turn right immediately after crossing over the North River bridge. There is a small boat ramp and dock there, that has adequate parking.

**SITE DESCRIPTION** - The site is located along the south bank of the North River, next to the boat dock and under the Hwy. 3A roadbridge. Station 1 is just to the west of the boat dock, Station 2 is under the road bridge and Station 3 is 50 m to the east of the bridge. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 There is a dense mussel bed along the south bank of the river, with all sizes of mussels present in large numbers.
- 1996 No collection.
- 1997 A very large population was found on the south bank of the river and samples were collected below low water.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The nominal site center lies in a narrow channel adjacent to the bridge where the bottom has been scoured clean by a strong current. The site was moved approximately 100 m to the west of the bridge near a marsh embankment. Sediments were a light grey over a very dark gray clay with many mussel shells and detritus.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 3 m

**SITE** - CLARKS ISLAND, DUXBURY BAY, MA

**SITE CODE** - DBCI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 42° 00.82' N

70° 38.19' W

**LOCATED ON NOAA CHART** - 13253

**SITE ACCESS** - This site has to be accessed by boat, and can be worked at any tide level. Follow Hwy. 3A south from Boston towards Cape Cod, and take Exit 11 east onto Hwy. 14 into Duxbury. Turn left down a small lane to the town boat ramp and harbormaster's office, just before the town square. Follow the channel closely south out to the red can "6" and then east to Clarks Island. The mudflats are very shallow here and the channel is fairly narrow in places - don't cut any corners. Mussels were collected using a stainless steel dredge. Site is subtidal, -5.0 m MLLW.

**SITE DESCRIPTION** - The site is located off the northern point of Clarks Island, and in the channel to the northeast. 1997 sediment site is located 400 m east of the point, 200 m east of a new pier and 100 m northwest of a house with a red chimney.

#### **BIVALVE COLLECTIONS**

1995 Large mussels were abundant throughout the area.

1996 No collection.

1997 Extremely large mussels were found just off the northern point in 9 feet of water. Mussels were found in sandy patches, between large rocks and boulders, so that the dredge could only be towed at a low speed for 30 seconds or less. Approximately 20 tows were attempted but nearly all of the samples were retrieved in the last two.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments at the nominal site center were too sandy. The site was moved approximately 400 m east to 42° 00.65' N, 79° 38.01' W, 25 m from shore. Sediments were a brown silty sand with razor clam shells and seagrass.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, -0.5 m MLLW  
sediments, 2 m

**SITE** - NAUSET HARBOR, CAPE COD, MA

**SITE CODE** - CCNH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 47.75' N

69° 56.77' W

**LOCATED ON NOAA CHART** - 13246

**SITE ACCESS** - This site is a walk-up that can only be sampled by hand at low tide. Follow Hwy. 6 out towards Cape Cod, and take Exit 6A east (right) Orleans. At the lights, turn right onto Main St. going towards Nauset Beach. Where the road makes a "Y", follow the North Beach Rd. towards Nauset Beach and on to the Ship's Knee's Inn, where you turn left onto Nauset Heights Rd. Turn left onto Doane Way and park opposite the "Dead End 500 ft" sign. Go down the wooden stairs to the shoreline.

**SITE DESCRIPTION** - The site is located in a small cove in Nauset Harbor. Mussels were collected about 100 m north of the wooden stairs on a small low-tide promontory. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 Blue mussels were very scarce throughout the area. Care should be taken in identifying the mussels, as the majority of the mussels were either the Ribbed or Horse Mussel species.
- 1996 No collection.
- 1997 Blue mussels were very scarce and were found mostly underneath large rocks where they could not be reached by sea ducks. Some mussels also were found along the outer bank of the marsh, however the majority of these were the ribbed mussel species.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected at a site 10 m from shore. Sediments were a grey, sandy clay.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held van Veen grab and a Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 1 m



**SITE** - WEST FALMOUTH, BUZZARDS BAY, MA

**SITE CODE** - BBWF

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 36.40' N

70° 39.17' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - Follow Hwy. 28 south to Cape Cod. Turn left (west) onto Hwy. 151 and head towards Old Silver Beach. Turn left again onto Hwy. 28 and take the first right at the rotary. Approximately 2.8 mi after the rotary, turn right onto Little Island Rd. and follow the unimproved road to the end. There is a cobble parking area at the end of the road. Follow the path through the trees to the jetty, or follow the Buzzards Bay shoreline to the left to get to the site. The site is located in a private wildlife area, that is accessible to the public.

**SITE DESCRIPTION** - The original site was located on the rocky point to the north of the jetty, at the mouth of West Falmouth Harbor. During the 1996 sampling season, three trips were made to this area and no live mussels were found on or under the rocks in the area. The only live mussels found were located on the top of the flat jetty in the splash zone, on the north side of the harbor. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Small scattered groups of small mussels were found on the top of the jetty. No mussels were found in the intertidal area of the jetty, or on the rocks on the point to the north of the jetty.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No 1996 collection. The original sediment site is located at 41° 36.77' N and 70° 40.37' W (Loran).

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - NAUSHON ISLAND, BUZZARDS BAY, MA

**SITE CODE** - BBNI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 30.85' N

70° 44.38' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - During the 1996 field season, the site was accessed by a small boat from WHOI, at Woods Hole. The site is located on the largest and southernmost of the Weepecket Islands, off the northern shore of Naushon Island in south-eastern Buzzards Bay.

**SITE DESCRIPTION** - The site is located on the intertidal rocks on the northeastern side of the largest Weepecket Island. The intertidal area is comprised of a cobble and boulder beach. Mussels were collected by hand and sediment using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Due to the very poor mussel population, this site was sampled as a composite collection. The mussels were found in crevices and under the larger rocks along the mid-tide zone. The mussels that were found were mainly alive and in good condition.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The original sediment site was found to have unacceptable sandy sediments. A new sediment site (41° 31.10' N and 70° 44.38' W) was found slightly farther to the north of the bivalve site, that contained fine-grained sediments.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and a stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 10 m

**SITE** - GOOSEBURY NECK, BUZZARDS BAY, MA

**SITE CODE** - BBGN

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 28.90' N

71° 02.24' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - From I-195, take Exit 10 and head south on Hwy. 88. Stay on the road, even after the State maintenance ends. At the end of the road, turn right and follow the road to the end where there is a parking area across a narrow paved causeway. Chandy's By The Sea, a long red building with white trim, is located to the left just before the gate at the causeway. The parking area co-ordinates are 41° 29.48' N and 71° 02.35' W. The site is located in the Horseneck Beach State Reservation, and there is a boat ramp at the parking area.

**SITE DESCRIPTION** - South of the parking area there are two coastal defense towers. Follow the path from the parking area, past the towers to the south. The site is located on the southern shore of Goosebury Neck. Mussels were collected by hand and sediment using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There were several exposed patches of mussels. The rocky intertidal area south and southeast of the point (original site area) was checked for mussels, but none were found this year.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected by grab from a small boat. Several areas were searched for suitable sediment, starting at the old sediment site location and moving northwards. Soft sediments (41° 29.54' N and 71° 01.26' W) were found generally to the east of Gumbys Head, and southeast of Horseneck Beach.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and a stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 10 m

**SITE** - ROUND HILL, BUZZARDS BAY, MA

**SITE CODE** - BBRH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 32.38' N

70° 55.70' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - From I-195, take Exit 12 and go south. Cross over Hwy. 6 and the road will become Chase Rd. When Chase Rd dead-ends, turn left onto Russell Mill Rd. Turn right onto Gulf Rd., and right again onto Smith Neck Rd. This road is the last turn before the bridge into Padaparam Village. Stay on Smith Neck Rd. to Round Hill (a private community with a golf course development). Turn left at the gate house, and follow the main road to the end where you will pass through a gate adorned with "white lions". Keep to the left, and the site is located at the southern end of Round Hill Point. Round Hill Point is privately owned. The only land access to the point is through the golf course development and through private property.

**SITE DESCRIPTION** - During the 1988 and 1990 field seasons, the sampling site was located on Dumping Rocks. The site is now located near the single large house on the small hill, to the south of the large radar antenna. Care should be taken as the black top road gets progressively worse around the point. The center of the site (Station 2) is located at the southern end of Round Hill Point, nearest Dumpings Rocks, Station 1 is right along the breakwater/retaining wall towards the house, and Station 3 is to the left towards the gate. The mussels were found near the mid-tide level under the larger rocks. Mussels were collected by hand and sediment was collected using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussels were collected at the southern end of Round Hill Point, from under the larger rocks near the mid-tide area. The mussel population was very scarce.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The original sediment samples were collected by hand from the sub-tidal areas east of the point, toward Dumping Rocks. In the 1996 field season, the sediments were collected from a boat (41° 32.58' N and 70° 55.53' W), because only coarse-grained sand was found on and around the mussel site.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and a stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 10 m

**SITE** - ANGELICA ROCK, BUZZARDS BAY, MA

**SITE CODE** - BBAR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 34.78' N

70° 51.54' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - This site can only be accessed by boat, because it is offshore. The site is located just southwest of Wilbur Point on Angelica Rock, at the southern end of Sconticut Neck. There is a good boat ramp on the eastern side of Sconticut Neck. In 1996 field season, a small boat was used from WHOI to access the site which is roughly due north across Buzzards Bay from Woods Hole.

**SITE DESCRIPTION** - The site is located on the intertidal rocks on the southern and eastern side of Angelica Rock. Angelica Rock is a small rock island, with a cobble/rock beach to the east and a sandy beach on the northern side. The weathered remains of a wooden windmill is located on the sandy portion of the island and serves as a good landmark. Mussels were collected by hand and sediment was collected using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Due to the poor mussel population, this site was sampled as a composite site and the stations were not differentiated. The mussels were found in crevices between the rocks on the southern shore of the island, and under the rocks on the eastern portion of the island. Both the mussels and the sediments that were collected from the Angelica Rock area, have a foul smell to them as though they were decomposing. There is also a large population of ribbed mussels in the higher intertidal areas.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The original sediment site is located to the east of the Fort Phoenix Channel - southeast of the red nun-buoy "10", near the yellow anchorage buoy. Suitable sediments were collected at 41° 35.24' N and 70° 52.61' W. This site is about a mile to the east of the sewage treatment plant on Clark's Point.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and a stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 9 m

**SITE** - ANGELICA POINT, BUZZARDS BAY, MA

**SITE CODE** - BBAP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 38.52' N

70° 45.88' W

**LOCATED ON NOAA CHART** - 13229

**SITE ACCESS** - This site was sampled as a boat site, but can be accessed as a walk-up site from the Point Connett area. There are several marinas in Mattapoisett Harbor area, that all have good boat ramps. In the 1996 field season, a small boat was used from WHOI to access the site which is located roughly due north across Buzzards Bay from Woods Hole.

**SITE DESCRIPTION** - The site is located just to the north of the red nun-buoy "2", at the southern end of Angelica Point. There are several houses on stilts to the east of the point, which serve as a good landmark. The mussels were collected from under the rocks on the southern and western sides of the point. Mussels were collected by hand and sediment using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Due to the poor mussel population, this site was sampled as a composite site. There is a large population of ribbed mussels in the higher intertidal areas.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected in the small cove, between Strawberry Point and Angelica Point, at a depth of 5 m.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and a stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 5 m

## **RHODE ISLAND SITES**

**SITE** - MOUNT HOPE BAY, NARRAGANSETT BAY, RI      **SITE CODE** - NBMH

**TARGET MATRIX** - Sediments

**NOMINAL SITE CENTER** - 41° 40.60' N                      71° 13.57' W (LORAN)

**LOCATED ON NOAA CHARTS** - 13221, 13223, and 13224

**SITE DESCRIPTION** - This sediment site is located 0.6 nautical miles due east of Mount Hope, located on Bristol Neck, and 0.4 nautical miles north of buoy CM C "3A."

### **BIVALVE COLLECTIONS**

Sediment site only.

### **SEDIMENT COLLECTIONS**

1997 Due to high winds and seas, sediments were collected in a more sheltered area, nearer to the Mount Hope shore, approximately 0.5 miles southwest of the site at 41° 40.28' N, 71° 14.08' W (GPS). Sediments were a silty clay with stones.

### **SAMPLING METHODS**

Sediments were collected using a Young-modified Van Veen Grab.

**WATER DEPTH** - Sediments, 5 m

**SITE** - DYER ISLAND, NARRAGANSETT BAY, RI

**SITE CODE** - NBDI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 36.29' N

71° 18.31' W

**LOCATED ON NOAA CHART** - 13223

**SITE ACCESS** - This site has to be accessed by boat, launched from the Bristol Harbor boat ramp. Follow Hwy. 114 north into Bristol, turn left (west) onto State Ave. just after the town library and drive down to the boat ramp. From here, follow the channel southwest for about 4.5 mi to the Sandy Point Light on Prudence Island, in Narragansett Bay.

**SITE DESCRIPTION** - The original site was located in the middle of the channel to the east of Sandy Point Light, in 25 m of water. After a number of unsuccessful dredging attempts to find mussels, the site was moved to an intertidal area just south of Sandy Point Light. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 Mussels were very scarce throughout the area, and the few that were found were below the low tide mark in the water. The mussels were all partially buried in the sediments and pebbles of the beach.

1996 No collection.

1997 Mussels could only be found in mats along a narrow band on the beach, one foot above the water line at low tide. These were small to medium-size.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Several grabs were washouts due to an abundance of empty slipper shells. The site was moved further out to 41° 36.27' N, 71° 18.27' W, 200 m east of the shore and 100 m southeast of the pier. Sediments were a dark grey, silty clay with large shells.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - Young modified van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 10 m

**SITE** - PATIENCE ISLAND, NARRAGANSETT BAY, RI

**SITE CODE** - NBPI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 39.19' N

71° 21.35' W

**LOCATED ON NOAA CHART** - 13224

**SITE ACCESS** - This site has to be accessed by boat, launched from the Bristol Harbor boat ramp. Follow Hwy. 114 north into Bristol, turn left (west) onto State Ave. just after the town library and drive down to the boat ramp. From here, follow the channel southwest out into Narragansett Bay and then northwest to Providence Point, and then southwest again to Patience Island.

**SITE DESCRIPTION** - The site is located on the southeast side of Patience Island, along the shoreline just to east of the rocks. Mussels were collected by hand. Site is intertidal, +1.0 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 Blue mussels were very scarce throughout the area, and only small specimens were found. Care should be taken in identifying the species, as more than one mussel species occurs here.
- 1996 The site was not scheduled for collection this year, but was collected as an alternate site. The blue mussels were collected from a narrow band in the mid-tide area, where they were attached to the rocks below a band of Atlantic ribbed mussels. The population was small in size and number. A small population of oysters was also found growing in the lower intertidal zone, that are nearly of commercial size.
- 1997 Mussels could only be found on the channel-facing sides of several large rocks. These were taken below the surface near low tide. No oysters or other mussel species were noted.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, 0 m MLLW

**SITE** - DUTCH ISLAND, NARRAGANSETT BAY, RI

**SITE CODE** - NBDU

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 29.47' N

71° 24.01' W

**LOCATED ON NOAA CHART** - 13223

**SITE ACCESS** - This site is accessed on foot and can only be sampled for mussels at low tide. Follow Hwy. 138 east onto Conanicut Island, and take the exit just before the Newport Toll Bridge. Follow the road into Jamestown and turn right at the first stop sign. At the next stop sign, turn left onto Southwest Ave. (right is onto North Main). Stay on this road and follow the signs to Fort Gerry. Turn right into the Park and then proceed to the northwest tip of the island. There is also a good public ramp here to launch the boat if sediments are to be collected

**SITE DESCRIPTION** - The site is located along the northwestern shoreline on the rocks below Fox Hill, in the Fort Gerry State Park. The site was originally located on the eastern shore of Dutch Island. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 There were very few small mussels to be found along this shoreline, attached to the underside of rocks and in numerous crevices.
- 1996 The mussel population was small, occurring in patches below the mid-tide line in crevices and under the larger rocks on the headland.
- 1997 A small population of mussels was found clustered in mats six inches above MLW. The mussels were mostly of a small size and the largest were found beneath large rocks.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The bottom was variable, with gravel, shells or sand found in some areas and muddier sediments in others. The best grabs were taken at 41° 29.44' N, 71° 24.14' W, approximately 100 m west of the shore. Here, the sediments were a grey, silty sand with shell hash over a sticky clay.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - modified Young van Veen grab and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW  
sediments, 10 m

**SITE** - BLOCK ISLAND, BLOCK ISLAND SOUND, RI

**SITE CODE** - BIBI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 11.89' N

71° 35.53' W

**LOCATED ON NOAA CHART** - 13217

**SITE ACCESS** - Take the ferry from Point Judith to Block Island. The site is 2.5 miles from the ferry on the inlet of the great salt pond. From the ferry, take a right onto Water St. and continue straight through a 4-way stop sign. The road dog-legs right and left into West Side (Fire Department Landmark) and bear left at a fork. Turn right onto a dirt road (Champlin's Rd.) and continue for about 1 mi to the Coast Guard Station on Harbor Neck. Park the vehicle in the carpark and take the walking trail access to the jetty.

**SITE DESCRIPTION** - The original site was on the north side of the cut into the Great Salt Pond, on Block Island. No mussels were found in the area, as the population had been denuded in a severe winter storm in the 1995 season. The site was moved to the southern breakwater where there was still a viable population of mussels. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 Small to medium sized mussels were found on the underside of the large rocks that made up the breakwater.
- 1996 The site was not scheduled for collection this year, but was collected as an alternate site. Patches of mussels were found on the bottom and protected sides of the larger intertidal rocks that made up the jetty. No mussels were found on the exposed surfaces of the rocks.
- 1997 The site is mid-way out along the southern jetty/breakwater. Mussels were found in abundance along sheltered walls of the jetty, just below the low tide waterline.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

## CONNECTICUT SITES

**SITE** - CONNECTICUT RIVER, LONG ISLAND SOUND, CT    **SITE CODE** - LICR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 16.00' N                      72° 20.50' W

**LOCATED ON NOAA CHART** - 12372

**SITE ACCESS** - This site has to be accessed by boat. From I-95 north, take Exit 69 onto Hwy. 9 south. Then take Exit 2 and turn right onto Essex road. Essex road dead ends, so turn right (only turn) onto Ferry road. The boat launch is under the I-95 bridge over the Connecticut River. The river is very rocky, so stay in the middle of the marked channel. The site is on the channel side of the eastern breakwater, at the mouth of the Connecticut River.

**SITE DESCRIPTION** - The site is located half way out along the eastern breakwater, and back towards the shoreline. There is a light tower at the seaward end of the jetty, and a second light at the landward end. Mussels were collected by hand and sediment using a stainless steel sediment grab and a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

### BIVALVE COLLECTIONS

1996 There is a large mussel population on the exposed rocks in the lower intertidal zone. There is also a small oyster population.

1997 No collection.

### SEDIMENT COLLECTIONS

1996 The sediment in the area is sand with very little fines. Several areas were sampled near the bivalve site, but no fine grained sediments were found. The sediment was collected from near the base of the jetty.

1997 No collection.

### SAMPLING METHODS

Mussels - hand

Sediments - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - lower intertidal, +0.5 m MLLW

**SITE - NEW HAVEN, LONG ISLAND SOUND, CT**

**SITE CODE - LINH**

**TARGET SPECIES - *Mytilus edulis***

**NOMINAL SITE CENTER - 41° 15.25' N**

**72° 56.36' W**

**LOCATED ON NOAA CHART - 12372**

**SITE ACCESS** - This is a walk-up site. The site is located in the Savin Rock area of West Haven. From I-95 north, take Exit 43 onto Hwy and head towards West Haven. Take Kelsey Ave south to the last major intersection before the Sound, and then turn left. At Washington St. turn right. Parking for the site is at the corner of Beach Rd. and Washington St. The Stowes Seafood Restaurant is on the corner, park in the lot of the next restaurant - The Original Food and Beverage Co. The site is reached by walking over a wooden pier, and then turning right (west) onto the beach.

**SITE DESCRIPTION** - The site is located on the first jetty to the right, about 50 m down the beach. The samples were collected along the western side of the first jetty. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussel population is large, ranging in size up to 8 cm, they were all attached to the exposed rock in the lower intertidal zone.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediment - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - HOUSATONIC RIVER, LONG ISLAND SOUND, CT      **SITE CODE** - LIHR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 41° 10.04' N                      73° 06.50' W

**LOCATED ON NOAA CHART** - 12364

**SITE ACCESS** - This can be a walk-up site, but the channel that has to be waded is over a meter deep at low tide. In Stratford, take Exit 32 off of I-95 north onto Main St. (this is also called R 113). Drive past the Bridgeport Municipal Airport (Igor Sigorsky) which will be on the right and take first right at the "Y" intersection onto Short Beach Rd. Then take the first left into the park and continue on around to the back. Park in the back left lot. Walk down to the small tidal stream and the shoreline.

**SITE DESCRIPTION** - The site is located across a small channel on the rock base of green channel marker "7". The stations are located at about one-third intervals around the base on the marker. Mussels were collected by hand and sediments by hand using a stainless steel scoop. Site is lower intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.  
1996 The mussels are abundant on the rocks. There is also a good population of oysters.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 The sediment were collected by hand from the intertidal and just subtidal areas on the shore adjacent to the marker.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - hand held stainless steel scoop

**WATER DEPTH** - lower intertidal, +0.5 m MLLW

**SITE - SHEFFIELD ISLAND, LONG ISLAND SOUND, CT**

**SITE CODE - LISI**

**TARGET SPECIES - *Mytilus edulis***

**NOMINAL SITE CENTER - 41° 03.16' N**

**73° 25.04' W**

**LOCATED ON NOAA CHART - 12364**

**SITE ACCESS** - This site can only be accessed by boat. The boat launch is at Veterans Park, in Norwalk. From I-95 north, take Exit 16 south into Norwalk. Continue south on East Ave. to the dead end, and then turn right onto Seaview Ave. The boat ramp is on the right before the bridge. Follow the channel to the south, to green channel marker "15". Take the right arm of the "Y" and continue on to the red channel marker "2". Site is to the south of channel on north shore of Sheffield Island.

**SITE DESCRIPTION** - The site is located about 200 m to the right of an old rock pier and the ruins of an old house - only the stone work and chimney remain. There is a large tree nearby at the top of the beach in the small cove. Mussels were collected by hand and sediments using a stainless steel grab and scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The site has a large mixed population of the Atlantic ribbed and blue mussels. They are all intertidal and occur in the marsh grass.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected in a channel to the right of the bivalve site. The sediment site is located at 41° 03.25' N and 73° 24.70' W.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

## NEW YORK SITES

**SITE - MAMARONECK, LONG ISLAND SOUND, NY**

**SITE CODE - LIMR**

**TARGET SPECIES - *Mytilus edulis***

**NOMINAL SITE CENTER - 40° 56.51' N**

**73° 42.19' W**

**LOCATED ON NOAA CHART - 12364**

**SITE ACCESS** - This site was sampled from a boat, but it could be done as a walk-up site at low tide. From I-95 going south, take Exit 19 and turn left into Mamaroneck. At the stoplight, turn right onto Hwy. 1. At the first stoplight on Hwy. 1, turn left onto Oakland Beach Rd. Then turn right onto Milton Rd., and then turn left onto Stuyvesant Rd. The American Yacht Club is at the end of the road. There is a good parking area just before the gate.

**SITE DESCRIPTION** - If the site is done as a boat site, the launch ramp is on the yacht club grounds. This site could be collected as a low tide site near the gate and launch at the American Yacht Club. The site was originally collected along the shore of Hen Island (across from the yacht club). In 1987, 1988 and 1990, the site was collected just to the south and west of the yacht club. In the 1996 season, the site was collected as a boat site, across the bay from the yacht club. Numerous dredges were made due south of small beach cottages with three wooden piers. This is in the farthest east area of the bay north of the small island at the mouth of the bay. Mussels were collected using a stainless steel dredge and sediments were collected by hand using a stainless steel scoop. Site is subtidal, -1.0 - 2.0 m MLLW.

### BIVALVE COLLECTIONS

1995 No collection.

1996 The mussels were dredged from the area just off the beach grass, due south of a small beach cottage with three wooden piers. The population is very small, and the mussels ranged from 2.0 - 6.0 cm in size. This site could be done as a walk-up site. Immediately north of the boat launch at the American Yacht Club, there is a jetty. On the northern side of the jetty, next to the rock retaining wall of a boat yard, is a rocky area with several large boulders and a good mussel population. This is located in the low tide area among the rocks and cobbles of the beach. A small oyster population is also present, attached to the cobbles and rocks on the beach.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The fine-grained sediment sample was collected on 4/5/96, from crevices in between the rocks, and from under some of the larger rocks. The sediment site is located at 40° 56.48' N and 73° 41.83' W on the beach.

1997 No collection.

### SAMPLING METHODS

Mussels - stainless steel dredge

Sediments - hand held stainless steel scoop

**WATER DEPTH** - subtidal, -1.0-2.0 m MLLW

**SITE** - THROGS NECK, LONG ISLAND SOUND, NY

**SITE CODE** - LITN

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 49.00' N

73° 47.90' W

**LOCATED ON NOAA CHART** - 12364

**SITE ACCESS** - Take I-95 north and then east onto I-295. Exit I-295 at Exit 8, which is the last exit before the toll gates for the Throgs Neck Bridge. Continue on to the left and into the Triborough Bridge and Tunnel Authority staff parking lot. The gate at the base of the bridge must be unlocked by the Tunnel Authorities. Go through the gate and follow the fence to the left. The site is under the bridge and to the east. Mussels were collected by hand and sediments by hand using a stainless steel scoop. Site is low intertidal, +0.25 m MLLW.

**SITE DESCRIPTION** - The site is the lowest intertidal area on the east side of the bridge. The site is located near and along the low tide mark, between the first bridge piling and the base of the north end of the bridge, on the eastern side.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a dense mussel population in the intertidal zone. The three stations were collected ~25 m apart along the shoreline.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was a black sandy mud.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand held stainless steel scoop

**WATER DEPTH** - low intertidal, +0.25 m MLLW



**SITE** - HUNTINGTON HARBOR, LONG ISLAND SOUND, NY **SITE CODE** - LIHU

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 55.32' N 73° 25.71' W

**LOCATED ON NOAA CHART** - 12364

**SITE ACCESS** - This walk-up site is located in the Target Rock Wildlife Refuge Area. From Hwy. 25A in Huntington, Long Island, take West Neck Rd. and drive north. Near the end of the road, turn right onto Target Rock Rd. Follow the road to the Refuge which will be on the right, the park ranger's house will be on the right opposite the parking lot. The park ranger will give you directions to the point, which is reached after a long walk through the woods.

**SITE DESCRIPTION** - The site is at least a half hour walk from the parking lot, and is located at the south end of East Beach, which curves around a large cove. Mussels are numerous and are mostly singles. Mussels were collected by hand and sediments by hand using a stainless steel scoop. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

- 1995 No collection.
- 1996 There is a large population of mussels buried in sediment, and attached to the cobbles in the intertidal zone. There is also a large population of single oysters.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The only sediments on the site are sands and cobbles. The sediment was collected from numerous small holes between the rocks in the intertidal zone.
- 1997 No collection.

#### **SAMPLING METHODS**

- Mussels - hand
- Sediments - hand held stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW.

**SITE** - PORT JEFFERSON, LONG ISLAND SOUND, NY

**SITE CODE** - LIPJ

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 57.44' N

73° 05.62' W

**LOCATED ON NOAA CHART** - 12362

**SITE ACCESS** - This site can only be accessed by boat, as the property along the shoreline is all privately owned. The boat ramp is at the Port Jefferson Yacht Club, which is in downtown Port Jefferson on Hwy. 25A. From the boat ramp, proceed at a heading of 326° for 1.3 nautical mi.

**SITE DESCRIPTION** - The intertidal site is located near the mouth of Setauket Harbor and is east of a "L"-shaped rock jetty and old wooden pilings. A second landmark is the large white mansion on the beach cliff above the site. Mussels were collected by hand and sediments using a stainless steel grab and scoop. Site is intertidal, +0.25 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussels are located in the low intertidal zone, buried in and amongst the shore grass and attached to cobbles.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected on the left side of the mouth of Setauket Harbor, near the pier - 40° 57.48' N and 73° 05.89' W.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.25 m MLLW

**SITE - GARDINERS BAY, LONG ISLAND, NY**

**SITE CODE - LIGB**

**TARGET SPECIES - *Mytilus edulis***

**NOMINAL SITE CENTER - 40° 59.89' N**

**72° 06.97' W**

**LOCATED ON NOAA CHART - 13209**

**SITE ACCESS** - This is a walk-up sampling site. Head east on Hwy. 27 through Amagansett, NY. In Southhampton, Hwy. 27 fades out and is now called RD 39 for the following three traffic lights. Follow signs to Hwy. 27. At the "Y" in the road, turn left and cross the R-R tracks. Proceed to the second "Y" in road and take the left arm onto Fresh Pond Rd. Turn left onto Cross Hwy and then right onto Alberts Landing Rd. Then turn right again onto Little Alberts Landing.

**SITE DESCRIPTION** - The site is located on the rock jetty to the left. The historical site is located on the treated wood and rock filled jetty to the left of the rock jetty. Mussels were collected by hand. Site is intertidal, +0.5 m MLLW.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussel population is very scarce. The mussels are mainly under the rocks or buried in the sediment.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - TUTHILL POINT, MORICHES BAY, NY

**SITE CODE** - MBTH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 46.60' N

72° 45.35' W

**LOCATED ON NOAA CHART** - 12352

**SITE ACCESS** - This site can only be accessed by boat. The boat ramp is at Tadsens Fishing Station. Take Hwy. 27 (Montauk Hwy.) east into Moriches and cross over the Terrell River Bridge, then turn south onto Bay Ave. At the end of the road, follow the signs to Tadsens Fishing Station. From the boat ramp, head south to the red navigation buoy "18".

**SITE DESCRIPTION** - The sampling site is located to the north of Moriches Inlet, on the intertidal and subtidal extensions of the mudflats just to the north of Hoot and Holler Island. Care should be taken here as the water is less than 0.5 m deep, and it would be very easy to get the boat beached on a falling tide.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Numerous dredges were taken from the channel to the beach, the only mussels to be found were near the beach - some 300 m south of the channel. The mussels were all very small and occurred in clumps of mainly dead shells in the intertidal zone along the beach.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected near red buoy "20", in about 2.5 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal. +0.5 m MLLW

**SITE** - FIRE ISLAND INLET, LONG ISLAND, NY

**SITE CODE** - LIFI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 37.51' N

73° 16.77' W

**LOCATED ON NOAA CHART** - 12352

**SITE ACCESS** - This is a walk-up site. From Islip, NY, take the Robert Moses Parkway south across two major bridges and then turn right into the Robert Moses State Park. Park at the Field 2 parking lot.

**SITE DESCRIPTION** - The site is on the north side of the island, between the two "B3" signs. The samples were collected from along the rock retaining wall.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussel population is fair, though they are generally on the small side. The larger ones are 3.0-4.0 cm in length.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - JONES INLET, LONG ISLAND, NY

**SITE CODE** - LIJI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 35.73' N      73° 35.20' W

**LOCATED ON NOAA CHART** - 12352

**SITE ACCESS** - This is a walk-up site. Follow Hwy. 27 (Montauk Hwy.) going east to Meadows, then go south along the Meadow Brook Parkway. Go west onto the Loop Parkway, that connects Meadows Island to Adler Island and on to the Town of Hempstead Park (on Long Beach Island). The site is located near the north end of the Long Beach Thoroughfare Bridge, before one crosses over into Hempstead Park/Point Lookout, and is to the east of the bridge.

**SITE DESCRIPTION** - The site is located on the rocks of the bridge abutment on the east side of the north end of the Long Beach Thoroughfare Bridge.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussel population is abundant, located in between and under the rocks of the bridge abutment.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - JAMAICA BAY, HUDSON-RARITAN BAY, NY

**SITE CODE** - HRJB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 34.00' N

73° 53.72' W

**LOCATED ON NOAA CHART** - 12350

**SITE ACCESS** - From New Jersey, take Hwy. 440 to Staten Island over the Outerbridge (toll-bridge) to the US 278 (Staten Island Expressway). Head east on US 278 to Brooklyn across the Verrazano Narrows Bridge (toll-bridge) to the Belt Parkway (Shore Parkway). Go east towards JFK Airport on the Parkway and take the Flatbush Ave. exit south. Go over the Gill Hodges Memorial Bridge (also called the Marine Parkway Bridge - toll) and go left to Roxbury. The site is located on the easternmost jetty in the Roxbury community at the end of the development. In 1997, this site was accessed by launching from the Sandy Hook, NJ Coast Guard station and motoring across the bay. This launch site was not very good, as it was covered with sand making traction difficult for the tow vehicle, especially without a 4-wheel drive.

**SITE DESCRIPTION** - The site is located along a jetty extending out into the bay.

#### **BIVALVE COLLECTIONS**

- 1995 There is a large population of mussels along the jetty. The majority of the mussels are buried in the sediments next to the jetty itself. Care should be taken here as this is an exposed site, and the spray from the waves can create problems.
- 1996 No collection.
- 1997 Mussel population on jetty was sparse, and no mussels were greater than 4 cm in length. Ribbed mussels were also found on the same jetty.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 None, however possible finer grain sediments may exist to the west of jetty in 2-4 ft. of water at low tide.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - UPPER BAY, HUDSON-RARITAN ESTUARY, NY

**SITE CODE** - HRUB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 41.36' N

74° 02.59' W

**LOCATED ON NOAA CHART** - 12327

**SITE ACCESS** - The site has to be accessed by boat, that can be launched at the Liberty Park boat ramps, in New Jersey. The site is on Liberty Island, on the northeast corner.

**SITE DESCRIPTION** - The nominal center of the site is on the rocky shoreline on the northeast corner of Liberty Island. The site extends from the pier south to the next corner of the island. Station 1 is about half way down the side of the island in the intertidal zone. Station 2 is situated in the area adjacent to the pier and Station 3 is at the opposite end of that side of the island.

#### **BIVALVE COLLECTIONS**

1995 The mussel population was very small, with few mussels larger than 4 cm. The mussels were partially buried in the sediments under the rocks, or attached to the underside of the rocks. Care should be taken in sampling this site as it is exposed to the weather and waves. Large wakes displaced by vessels entering and leaving the Harbor have to be carefully watched.

1996 No collection.

1997 Over 7 attempts were made using 3-4 min. dredge tows around all water surrounding Liberty Island, excluding ferry dock. Dredges came up with NO mussels, only oyster shells/hash, pieces of glass and brick.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - LOWER BAY (Swinburne Is.), HUDSON-RARITAN ESTUARY, NY **SITE CODE** - HRLB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 33.96' N 74° 03.05' W  
**LOCATED ON NOAA CHART** - 12327

**SITE ACCESS** - A boat is needed to access Swinburne Island, in Lower Bay. Landmarks on the island are several old dilapidated red brick buildings. The waters surrounding the island are very shallow, with the intertidal area being covered with rock and rubble. Care should be taken in approaching. The best approach is from the west.

**SITE DESCRIPTION** - The site is located in a small cove on the northwest corner of the island. Landmarks include: a jetty at the northwestern margin of the cove, and a large iron pulley and iron pipe just to the landward of the site.

#### **BIVALVE COLLECTIONS**

- 1995 There were numerous mussels attached to the rocks around the cove. They were generally above the low tide line and were found in small crevasses and cavities in the rocks. Care should be taken when collecting this site, as the wind and waves are fully exposed here. This site has to be collected at low tide.
- 1996 No collection.
- 1997 There was an abundance of blue mussels in the 5-7 cm size, with a few ribbed mussels seen in this cove.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Attempts were made to collect sediment in water 8-17 ft deep from the northern and southern points of the island. No fine grain sediment found. Only sand, coarse sand, and some shells.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - RARITAN BAY, HUDSON-RARITAN ESTUARY, NY **SITE CODE** - HRRB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 31.14' N 74° 11.07' W

**LOCATED ON NOAA CHART** - 12327

**SITE ACCESS** - From New Jersey, take Hwy. 440 to Staten Island across the Outerbridge (toll-bridge). Just after the toll booth, take Page Ave. onto Hylan - turn left and follow Hylan to Huguenot Ave. and turn right. Huguenot will dead end at the site. The surrounding area is very developed.

**SITE DESCRIPTION** - The site is located at the three rock jetties, one at the end of Huguenot St. and the others further to the right. Station 1 is on the jetty at the end of Huguenot St., Station 2 is on the short wide jetty to the west of Station 1 and Station 3 is on the westernmost narrow jetty with a row of decaying pilings.

#### **BIVALVE COLLECTIONS**

1995 There was a good population of blue mussels at the site that were easy to collect. Care should be taken with the identification of the mussels as the majority of the mussels are ribbed mussels. This is a low tide collection site.

1996 No collection.

1997 Collected blue mussels at Sites 2 and 3 (mixed). Mussels were small in size, 3.5-4.5 cm. Did not see any ribbed mussels.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Collected sediment nearshore at low tide using the Kynar scoop.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - Kynar scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

## NEW JERSEY SITES

**SITE** - SANDY HOOK, NEW YORK BIGHT, NJ

**SITE CODE** - NYSH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 29.25' N

74° 02.00' W

**LOCATED ON NOAA CHART** - 12327

**SITE ACCESS** - This site has to be accessed by boat, and collected by dredge. There is a good boat ramp at Highlands, in the New Jersey docks. Run time to the site was about 30 minutes, across the New York Bight towards Sandy Hook. The mussel beds are just off the main shipping channel, so a good watch should be kept on the local shipping traffic.

**SITE DESCRIPTION** - The original site is north of the Raritan Bay East Reach Channel and west of the Chapel Hill South Channel, close to where they cross one another. No live mussels were found here so the site was moved 0.5 mi to the east-southeast.

### BIVALVE COLLECTIONS

1995 There was a good mussel population at the new site, with lots of mussels of over 5 cm being common. There is a vast quantity of old shell forming the substrate here, and this made up the bulk of the dredge hauls.

1996 No collection.

1997 It was difficult to find a good mussel population. A minimum of 12 dredge tows were performed before locating a bed of mussels at a depth of 16-21 feet. Mussels were in the 4-5 cm range.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 No collection.

1997 No collection.

### SAMPLING METHODS

Mussels - stainless steel dredge

Sediments - N/A

**WATER DEPTH** - subtidal, -6.5 to 9.0 m MLLW

**SITE** - LONG BRANCH, NEW YORK BIGHT, NJ

**SITE CODE** - NYLB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 17.69' N

73° 58.72' W

**LOCATED ON NOAA CHART** - 12324

**SITE ACCESS** - In New Jersey, travel south on Hwy. 36, which is also called Ocean Blvd. Stay on Ocean Blvd. (becomes County 57) when Hwy. 36 heads inland. Turn left after the first set of lights after the Hilton Hotel, onto Chelsea Ave. Chelsea Ave. dead ends so turn right onto Ocean Ave. The site is on the shoreline opposite Nonnia's Restaurant, where there is adequate parking and brick restrooms on the sea-wall.

**SITE DESCRIPTION** - The site is located on the fifth jetty after the fishing pier, and is about 0.5 mi south of the pier. The granite jetty is concreted on top to provide a good walking surface. Samples were collected from both sides of the jetty.

#### **BIVALVE COLLECTIONS**

1995 There is a very large mussel population here, with all of the available space in the intertidal area being covered with mussels. Care should be taken here as large waves regularly wash over the entire jetty in rough weather.

1996 No collection.

1997 Mussels were collected on the north side of jetty near the point. Mussels were approximately 3.5-5.5 cm long.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - SHARK RIVER, NEW YORK BIGHT, NJ

**SITE CODE** - NYSR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 40° 11.22' N

74° 00.54' W

**LOCATED ON NOAA CHART** - 12324

**SITE ACCESS** - In New Jersey, travel south on Hwy. 36 to Long Branch. In Long Branch, Hwy. 36 heads inland, stay on Ocean Blvd. heading south. Hwy. 71 will join Ocean Blvd., continue on south towards Belmar. Turn left at the first set of lights after crossing the Shark's River Inlet, onto 5th Ave. This road dead ends into Ocean Ave. where you will turn left. The site is on the southern jetty of the Shark River Inlet. There is adequate parking at the Belmar Fishing Clubhouse near the bridge.

**SITE DESCRIPTION** - The original site was on the south side of the southern jetty forming the Shark River Inlet. Beach replenishment and sand movement have left no live mussels on the south side of the jetty. The site was moved to the north side of the southern jetty in the Shark River Inlet. Samples were collected in an area seaward of the bridge and behind the washed out retaining wall and along the jetty.

#### **BIVALVE COLLECTIONS**

- 1995 There was a good population of mussels attached to the rocks along the north side of the jetty. Care should be taken here as large waves enter the inlet from the Atlantic, and wash along the jetty.
- 1996 No collection.
- 1997 Mussels were collected on the southern jetty in the Shark River Inlet. Mussels were approximately 3.5-.6.0 cm long.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - BARNEGAT LIGHT, BARNEGAT INLET, NJ

**SITE CODE** - BIBL

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 39° 45.70' N

74° 05.70' W

**LOCATED ON NOAA CHART** - 12324

**SITE ACCESS** - This site is a walk-up site. The site is located in the Barnegat Light State Park. Travel south on the Garden State Parkway (toll road) and take Exit 63 east onto Hwy. 72. In Ship Bottom, NJ, turn left and follow the signs to Barnegat Light. Follow the walkway out along the breakwater to the end, and then out on the jetty.

**SITE DESCRIPTION** - The site is located about 1/3 to 1/2 the way out on the jetty, on the inlet side. The site is about as far out on the jetty as can be safely collected, due to ocean waves.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a good mussel population, but most of the mussels were less than 2 cm in length. Larger mussels were found in the well protected locations on the jetty.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected between the two jetties (which are about 10 m apart) at the base of the light house.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - ATLANTIC CITY, ABSECON INLET, NJ

**SITE CODE** - AIAC

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 39° 22.03' N

74° 24.67' W

**LOCATED ON NOAA CHART** - 12316

**SITE ACCESS** - This is a walk-up site. From the Atlantic City Parkway, take a left onto Arctic Ave. and then a right onto Pennsylvania Ave. Turn left again onto Pacific Ave, and the site is located at the jetty at the end of the road. Walk under the Boardwalk to reach the jetty.

**SITE DESCRIPTION** - The sampling site is located on the western (inlet) side of the Absecon Inlet rock jetty wall.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The mussel population is very large and is nearly a continuous mass on the jetty. Most of the mussels were less than 3 cm in length. Larger mussels were found lower down and in protected locations along the jetty. Many of the mussels were in poor condition, and gaped open within a few minutes after being handled.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - CAPE MAY, DELAWARE BAY, NJ

**SITE CODE** - DBCM

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 38° 58.93' N

74° 57.68' W

**LOCATED ON NOAA CHART** - 12314

**SITE ACCESS** - In New Jersey, follow the Garden State Parkway south to Cape May and take the Lewes Ferry exit going west. This is US 9 (or Hwy. 109), follow the road to North Cape May. When US 9 forms a "Y" and goes left into the ferry terminal, keep going straight and onto Lincoln Blvd. This road dead ends, turn right onto Beach Drive and go to Roslyn Ave. where there is parking. The site is located at the third jetty, which is slightly to the left of the parking area.

**SITE DESCRIPTION** - The site is located on a small wooden seawall with a rock island to the seaward. Samples were collected from the southern side of the rock area and near the landward end of the seawall; on the seaward tip of the jetty; and on the northern side of the jetty at the landward end of the rock area.

#### **BIVALVE COLLECTIONS**

- 1995 There was a good mussel population attached to the rocks across the entire area.  
1996 The mussels were collected from along the rocks, in the high intertidal area. The population on the exposed rocks in the lower intertidal areas have been overgrown by Sabellid worms, that have not affected the oyster population.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.  
1996 The sediment sample was collected from an area adjacent to the jetty.  
1997 No collection.

#### **SAMPLING METHODS**

- Mussels - hand  
Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW





**SITE** - ARNOLDS POINT SHOAL, DELAWARE BAY, NJ      **SITE CODE** - DBAP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 39° 23.00' N                      75° 27.00' W

**LOCATED ON NOAA CHART** - 12304

**SITE ACCESS** - This site has to be accessed by boat. There is a good all-weather boat launch at the Greenwich Boat Works. From Bridgeton, NJ, take Hwy. 49 north and turn left onto County 607. Follow the road into Greenwich, and the signs to the Ship Johns Inn. Turn left at the Inn and go one block, then turn right and follow the signs to Greenwich Boat Works. The site is located about 5.6 mi northwest of the Cohansey River mouth.

**SITE DESCRIPTION** - The site is actually not on the Arnolds Point Shoal, but off to one side in much deeper water. The historical site location and surrounding area was dredged for several hours, without finding any live oysters and only a few old dead shells.

**BIVALVE COLLECTIONS**

- 1995 No collection.
- 1996 The site has very few oysters. Compared to DBBD and DBFE most of the oysters were alive but smaller in size.
- 1997 No collection.

**SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The sediment sample was collected from 39° 23.15' N and 75° 27.00' W.
- 1997 No collection.

**SAMPLING METHODS**

- Oysters - stainless steel dredge
- Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal. -5.0-6.0 m MLLW

**SITE** - HOPE CREEK, DELAWARE BAY, NJ  
**TARGET SPECIES** - *Crassostrea virginica*

**SITE CODE** - DBHC

**NOMINAL SITE CENTER** - 39° 25.60' N

75° 29.60' W

**LOCATED ON NOAA CHART** - 12311

**SITE ACCESS** - A boat may be launched at the Woodland Beach launch ramp, at the end of Rte. 6 out of Smyrna, DE.

**SITE DESCRIPTION** - Adult bivalve populations exist at the mouth of Hope Creek and extend to Fishing Creek. The oysters in Hope creek are adversely affected during the spring runoffs and do best when salinities are higher later in the season. A more stable bivalve population exists further down river at the bivalve site center, west of Adler Cove and Fishing Creek. Bearings for this area are 150 degrees from the Hope Creek Jetty (Fl 4 sec 16 ft 5 m) and 100 degrees from R "8" Fl R 4 sec.

#### **BIVALVE COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge  
Sediments - N/A

**WATER DEPTH** - 6 m

## DELAWARE SITES

**SITE** - KELLY ISLAND, DELAWARE BAY, DE

**SITE CODE** - DBKI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 39° 12.19' N

75° 21.54' W

**LOCATED ON NOAA CHART** - 12304

**SITE ACCESS** - This site can only be accessed by boat. There is a good boat ramp at Port Mahon. From Hwy. 13 in Dover, DE, take Route 8 east heading towards Little Creek. At the "T" junction, turn right onto Route 9 and take the first left turn onto the Port Mahon Rd. Follow the road east to the end where the ramp is located, the surface will change from paved to dirt. The road reportedly floods at very high tides. This is not an all-weather ramp, as the ramp was frozen in for several days in December, 1995. From the boat launch, follow the cut out to the channel. Take care, as the cut has several shallow areas. Follow the channel out to green channel marker "3".

**SITE DESCRIPTION** - The site is located just to the north of green channel marker "3", and appears to be on a staked oyster bed. There is very little clutch on this site, which is on mud.

### BIVALVE COLLECTIONS

1995 No collection.

1996 There were very few live oysters to be found at this site.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The sediment sample was a soft brown mud.

1997 No collection.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 2.0-3.0 m MLLW

**SITE** - WOODLAND BEACH, DELAWARE BAY, DE

**SITE CODE** - DBWB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 39° 19.92' N

75° 27.42' W

**LOCATED ON NOS CHART** - 12304

**SITE ACCESS** - Take Route 13 in Smyrna, DE to Route 6 and east to Woodland Beach. The Woodland Beach launch ramp and waterfowl check station is located at the end of Route 6.

**SITE DESCRIPTION** - Woodland Beach is the northernmost range of *Crassostrea virginica* on the Delaware side of the Delaware Bay. Subtidal bivalves are located 0.5 nautical miles south of the boat ramp at Woodland Beach. These state-owned oyster beds are approximately 100-200 m offshore in the area north of Bombay Hook Point. The area is listed as "oyster grounds" on the NOAA nautical chart.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There were very few live oysters to be found at this site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was a soft brown mud.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 2.0-3.0 m MLLW

**SITE** - CAPE HENLOPEN, DELAWARE BAY, DE

**SITE CODE** - DBCH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 38° 47.01' N

75° 07.23' W

**LOCATED ON NOAA CHART** - 12316

**SITE ACCESS** - In Maryland, follow Hwy. 1 south to US 9 East and then towards the Cape May - Lewes Ferry Terminal. There is adequate parking in the ferry terminal area or in the Pilot Point Community. From there, walk out to the site.

**SITE DESCRIPTION** - The site is located on the western side of the breakwater that forms the ferry harbor. The long seawall has a dog-leg turn in the middle to the east. The mussels were collected between the two lighted towers, FI R 4 sec 27 ft and E Int R 2 sec 48 ft. Station 1 is about 30 m past the bend, Station 2 is at the bend and Station 3 is about 30 m before the bend.

#### **BIVALVE COLLECTIONS**

1995 There was a very good population of mussels all along the breakwater. Care should be taken here as the breakwater ices over in winter, and the whole area is subjected to heavy Atlantic swells.

1996 The mussel population was smaller than that of the previous year. The small mussels were found in protected areas of the breakwater, under and in between the rocks.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark silty sediment sample were collected from just outside the ferry terminal breakwater, at 38° 47.21' N and 75° 07.42' W. This sample was collected in December, 1995.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, -0.5 m MLLW

## MARYLAND SITES

**SITE** - BODKIN POINT, CHESAPEAKE BAY, MD

**SITE CODE** - CBBO

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 39° 09.44' N

76° 24.29' W

**LOCATED ON NOAA CHART** - 12273

**SITE ACCESS** - A boat is needed to access this site in the middle of Chesapeake Bay. From Annapolis, follow Hwy. 50 (Hwy. 301) towards the Chesapeake Bay bridge and take the last exit before the toll booths. Follow the signs to the Sandy Point State Park Marina, where there is a good boat ramp. By boat, follow the markers out of the marina and turn left at the last marker and head towards the first Lighthouse in the Bay. This is the entrance to the Craighill Ship Channel that will lead you north to the site.

**SITE DESCRIPTION** - The site is located just to the north of Sevenfoot Knoll, that lies to the east of the Craighill Ship Channel near the red nun buoy "22". Another landmark is the marine warning platform and sign "Large wave may happen due to shipping traffic". The stations were not differentiated as the oyster population was very scarce.

### BIVALVE COLLECTIONS

- 1995 There were very few medium sized oysters to be found in the area.
- 1996 No collection.
- 1997 A sufficient number of medium-sized oysters were collected in three tows. Oysters occurred in singles and were retrieved amongst a large quantity of empty shells.

### SEDIMENT COLLECTIONS

- 1995 None
- 1996 No collection.
- 1997 Suitable sediments (grey, silty clay with shell hash) were collected at the nominal site center.

### SAMPLING METHODS

- Oysters - stainless steel dredge
- Sediments - modified Van Veen grab and Kynar coated scoop

**WATER DEPTH** - subtidal, -5.0 m MLLW



**SITE** - HACKETT POINT BAR, CHESAPEAKE BAY, MD

**SITE CODE** - CBHP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 58.17' N

76° 24.88' W

**LOCATED ON NOAA CHART** - 12286

**SITE ACCESS** - A boat is needed to access this site in the middle of Chesapeake Bay. From Annapolis, follow Hwy. 50 (Hwy. 301) towards the Chesapeake Bay bridge and take the last exit before the toll booths. Follow the signs to the Sandy Point State Park Marina, where there is a good boat ramp. By boat, follow the markers out of the marina and run parallel to the bridge to the 12th set of bridge legs, go under the bridge and the site is a 3 mi run from there.

**SITE DESCRIPTION** - The site is due west of the radio towers, southeast from Hackett Point and is just to the east (~400 m) of the green can buoy "1". The stations were not differentiated due to the scarcity of oysters and the lack of any suitable nearby landmarks.

#### **BIVALVE COLLECTIONS**

1995 There were very few oysters to be found in the area.

1996 No collection.

1997 A sufficient number of oysters were collected in six dredge tows. Oysters were mostly very large ( $\geq 20$  cm).

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 The nominal site was located over the edge of a hole and the first three grabs were washouts, containing shell and rock debris. The site was moved to 38° 57.90' N, 76° 24.94' W, where suitable sediments of a grey silty clay were collected.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -2.5 m MLLW; 1997: depth was 10 m.

**SITE** - CHOPTANK RIVER, CHESAPEAKE BAY, MD

**SITE CODE** - CBCP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 36.44' N

76° 07.20' W

**LOCATED ON NOAA CHART** - 12260

**SITE ACCESS** - This site can only be accessed by boat launched in the Choptank River. Follow Hwy. 50 from Annapolis down to Cambridge and exit onto Hwy. 343 (Washington St.) going west through the town. Where the road makes a "Y", at the Longs Country Store, take the right hand fork. About a mile down the road on the right is the Univ. of Maryland Horn Point Environmental Lab. The gate posts are red brick and are topped with Ram's heads. Launch the boat at the Lab and go out to the site in the Choptank River.

**SITE DESCRIPTION** - The site is located on the Howell Point side of the channel, between the green markers "19" and "19A". The stations were not differentiated due to the extreme scarcity of the oysters.

#### **BIVALVE COLLECTIONS**

1995 The large oysters were very scarce and occurred in singles. There were no oyster beds or reefs in the area. Over twenty dredge tows were required to collect a sufficient number of oysters for the sample.

1996 No collection.

1997 A sufficient number of oysters were collected after seven dredge tows. A swift current moved through the channel, where depths on either side changed rapidly from 1 to 10 m. Oysters were found in singles and were completely encased by mussels.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Suitable sediments (brown, silty/sandy clay) were collected at the nominal site center.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -4.0 m MLLW

**SITE** - HOG POINT, CHESAPEAKE BAY, MD

**SITE CODE** - CBHG

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 18.74' N

76° 23.87' W

**LOCATED ON NOAA CHART** - 12230

**SITE ACCESS** - This site is accessed by boat launched at the boat ramp under the Hwy. 2 (4) Patuxent River Bridge. From here, head out down the Patuxent River towards Chesapeake Bay to the green channel marker "1". The site is just to the south of the marker, and to the north of the shoreline.

**SITE DESCRIPTION** - The site is located at the mouth of the Patuxent River into Chesapeake Bay, between Cedar Point and Hog Point. The entire area was searched and dredged for oysters, but no viable reefs or beds were found.

#### **BIVALVE COLLECTIONS**

- 1995 Only two live oysters were found after a large number of dredge tows. There was a great deal of shell found, all covered with "bryo".
- 1996 No collection.
- 1997 Twelve dredge tows were required to obtain a sufficient number of oysters. However, nearly all of the oysters were collected in three short tows over a very narrow reef at approximately 38° 18.85' N, 76° 23.77' W.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments of a brown silty sand with shell hash were collected at the nominal site center.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge  
Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -6.0 m MLLW

**SITE** - SWAN POINT, POTOMAC RIVER, MD

**SITE CODE** - PRSP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 16.90' N

76° 56.02' W

**LOCATED ON NOAA CHART** - 12286

**SITE ACCESS** - The site is accessed by boat launched at the Colonial Beach boat ramps. Drive south from Washington on Hwy. 301 and cross the Potomac River, then turn left onto Hwy. 218, and left again onto Hwy. 205 which will take you to Colonial Beach. Head north out across the Potomac River to the north of the Kettle Bottleneck, to Swan Point on the northern shoreline.

**SITE DESCRIPTION** - The site is located just off Swan Point, between the Radar Reflector and the green can buoy "Q".

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Oysters were plentiful and more than a sufficient number were collected after three dredge tows. Oysters were retrieved amongst a large quantity of empty shells and were covered with both mussels and barnacles.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Many grabs were washouts because of the oyster shell debris and the site was moved slightly to 38° 17.13' N, 76° 56.26' W where sediments of a light brown, silty clay were collected.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -4.0 m MLLW

## VIRGINIA SITES

**SITE** - MATTOX CREEK, POTOMAC RIVER, VA

**SITE CODE** - PRMC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 13.40' N

76° 57.69' W

**LOCATED ON NOAA CHART** - 12286

**SITE ACCESS** - The site is accessed by boat launched at the Colonial Beach boat ramps. Drive south from Washington on Hwy. 301 and cross the Potomac River, then turn left onto Hwy. 218, and left again onto Hwy. 205 which will take you to Colonial Beach. Head southeast down the Potomac River to the Kettle Bottleneck, and then west to the site at the mouth of the Monroe Creek.

**SITE DESCRIPTION** - The site is located just off Gumbar Point, between the red channel markers "2" and "4". There is also a white seawall, with 4 sets of stairs leading down to the beach, some 250 m to the west.

### BIVALVE COLLECTIONS

- 1995 There was a good sized population of oysters in the area, occurring in clumps with mussels attached to them.
- 1996 No collection.
- 1997 Oysters were plentiful, but mostly small so that ten dredge tows were required to obtain samples of a sufficient size and quantity. The most successful trawls were located nearer to the seawall (~0.5 km from shore).

### SEDIMENT COLLECTIONS

- 1995 No collection.
- 1996 No collection.
- 1997 Several grabs were washouts because of the large quantity of shell debris. The initial site was moved slightly to 38° 13.32' N, 76° 57.49' W, where sediments of a light brown silt over grey clay with shells were collected.

### SAMPLING METHODS

- Oysters - stainless steel dredge  
Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -3.0 m MLLW

**SITE** - RAGGED POINT, POTOMAC RIVER, VA

**SITE CODE** - PRRP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 38° 09.30' N

76° 36.05' W

**LOCATED ON NOAA CHART** - 12286

**SITE ACCESS** - This site is accessed by boat launched from the Ragged Point Marina. Drive south from Washington on Hwy. 301, and then go east on Hwy. 17 to Tappahannock. Go northeast on Hwy. 360 to Warsaw, then north on Hwy. 3 to Templeman. Turn right onto Hwy. 202 then left onto Hwy. 612 and drive to Coles Point. Then take Hwy 728 to the marina and boat ramp in Ragged Point.

**SITE DESCRIPTION** - The site is located just off Ragged Point to the northeast, near the rock pile with the metal navigational aid frame "51". The stations were not differentiated as the oysters were not found on any recognizable bed or reef system.

#### **BIVALVE COLLECTIONS**

1995 The oysters were very scarce and over twenty dredge tows were required to obtain sufficient numbers for a sample.

1996 No collection.

1997 A sufficient number of medium-sized oysters were collected in five tows. Oysters occurred in singles and were encrusted with mussels.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were a very silty, black clay with a thin sandy surface and a faint sulfur odor.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -3.5 m MLLW

**SITE** - INGRAM BAY, CHESAPEAKE BAY, VA

**SITE CODE** - CBIB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 47.63' N

76° 17.06' W

**LOCATED ON NOS CHARTS** - 12220

**SITE ACCESS** - From Rappahannock travel Route 17 to Route 360 toward the coast. At Reedville take Route 657 to Fleeton; the ramp is located in Fleeton on Route 692 and launches into Ingram Bay.

**SITE DESCRIPTION** - The site center is slightly west of the Great Wicomico River Light near the R "N4" navigation aid (just about in the center of Ingram Bay). The site is located 1,000 m northeast of Dameron Marsh within Ingram Bay.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - dredge

**WATER DEPTH** - subtidal, 5 m

**SITE** - ROSS ROCK, RAPPAHANNOCK RIVER, VA

**SITE CODE** - RRRR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 54.12' N

76° 47.27' W

**LOCATED ON NOAA CHART** - 12237

**SITE ACCESS** - This site can only be accessed by boat, launched at the public ramp in Tappahannock. From Washington, drive south on Hwy. 301 and cross the Potomac River, turn left onto Hwy. 17 that will take you to Tappahannock. The ramp is at the end of Dock St. From here, go down the narrow creek to the Rappahannock River, then head out east-southeast down the river to the site.

**SITE DESCRIPTION** - The site is located to the north of Accaceek Point and to the east of Ross Rock and 1/3 of the distance inshore from the green can buoy "23" and red nun buoy "24". There is a trailer park on the shore opposite the site. The reef is a long narrow one, and lies in 6 to 7 ft of water. The surrounding water is about 15 ft deep. The stations were not differentiated due to the scarcity of the oysters.

#### **BIVALVE COLLECTIONS**

- 1995 Some 50% of the medium sized oysters were dead on the reef. The single oysters were all covered with barnacles and very few spat were observed.
- 1996 No collection.
- 1997 Twelve dredge tows were required to obtain a sufficient number of oysters, which were found mostly over a narrow reef near 37° 54.09' N, 76° 47.41' W. Oysters were mostly small, found in singles and covered with barnacles.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments of a thick (1-2 inches), brown silt over a dark grey, silty clay were collected at the nominal site center. Sediments were so silty that they went over the top of the grab.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge  
Sediments - modified Van Veen grab and a Kynar coated scoop

**WATER DEPTH** - subtidal, -3.0 m MLLW

**SITE** - DANDY POINT, CHESAPEAKE BAY, VA

**SITE CODE** - CBDP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 05.90' N

76° 17.69' W

**LOCATED ON NOAA CHART** - 12238

**SITE ACCESS** - The site has to be accessed by boat, from the Dandy Point public boat ramp. The run time is less than three minutes. Follow Interstate 64 through Newport News into Hampton, then take a left onto Mercury Blvd. (also 4517) away from the James River Bridge. Turn left again onto Hwy. 169 south (also called Fox Hill Rd.) and follow the road to Dandy Point Rd. and on to the end. The site is too shallow to be accessed by vessels larger than a small boat, except through a very narrow channel and only at high tide.

**SITE DESCRIPTION** - The site lies just to the north of a marsh island to the northwest of Dandy Point. There is a small brown wooden cabin, with an orange roof, on the east end of the island. There is also a small wooden pier extending out to the east from the cabin. Station 1 is located at the western point of the island, Station 2 is on the north side off the middle of the island and Station 3 is at the eastern end of the island.

#### **BIVALVE COLLECTIONS**

- 1995 The entire area is covered with mussels, and there were only a few small and occasionally medium sized oysters to be found. It would be easier to collect this site at low tide, when the oysters could be seen and collected by hand.
- 1996 No collection.
- 1997 The site was accessed by foot at low tide, however, the narrow channel just before the marsh island was still 1 m deep. Oysters were scarce, with the highest concentration found along the inner side of the island, approximately 3 m from shore in very soft sediment. Oysters were found in singles of small to medium-size. No significant quantities of mussels were observed.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected within a very narrow channel, approximately 50 m from shore. Sediments were a dark brown/grey clay with some SAV and detritus on the surface.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - Petite PONAR grab from small boat and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - JAMES RIVER, CHESAPEAKE BAY, VA

**SITE CODE** - CBJR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 03.92' N

76° 37.93' W

**LOCATED ON NOAA CHART** - 12248

**SITE ACCESS** - This site is accessed by small boat, launched out of Tyler Beach on the James River. From Newport News, cross over the river on the James River Bridge and go west onto Route 32. Turn west again onto Route 10 and follow the signs to the public boat ramp at Tyler Beach. From the boat ramp exit out via the channel into James River, at the green channel marker "1" take a bearing of 65° and travel 1.9 mi to the site.

**SITE DESCRIPTION** - The site is located on the southeast corner of the Point of Shoals, in Burwell Bay on the James River. The location is approximately equidistant from the green channel marker "1" and the Rocklanding Shoal Channel green can buoy "13". The area is extensively tonged by commercial oystermen. The stations were not differentiated due to the lack of oysters over the entire area. Many areas around the site are less than 1 meter deep at high tide.

#### **BIVALVE COLLECTIONS**

1995 The oysters were scarce and generally medium in size.

1996 No collection.

1997 Many hundreds of small oysters, growing together in clumps, were collected. Three short (under two minutes) tows were required to collect oysters of a sufficient size and quantity.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected from 37° 03.82' N, 76° 37.91' W, as the nominal site center was too shallow (~1m) to be reached at high tide. Sediments were a fine, brown silt over grey clay with shell debris.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Van Veen grab

**WATER DEPTH** - subtidal, -3.5 m MLLW

**SITE** - CAPE CHARLES, CHESAPEAKE BAY, VA

**SITE CODE** - CBCC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 17.07' N

76° 00.92' W

**LOCATED ON NOAA CHART** - 12224

**SITE ACCESS** - This site is a walk-up, and can easily be accessed on foot. Follow Hwy. 13 south down through Maryland and into Virginia, and then turn right (west) onto Hwy. 680 just south of Cheriton. There is a large sign here for the Cherrystone Campground, at the stoplight.

**SITE DESCRIPTION** - The Cherrystone Aqua Farm is right next to the campground, with the site being on the bayside of the largest marsh island 0.25 mi offshore, opposite the pumping station. Station 1 is located at the northern end of the island, Station 2 is at the broadest part of the island where there is a small shell beach and Station 3 is located at the narrow southern end of the island.

#### **BIVALVE COLLECTIONS**

- 1995 The few oysters that were found were scattered across the entire area, along the edge of the marsh grass and just out from the edge of the island.
- 1996 No collection.
- 1997 The only oysters found were growing along the outer edge of the marsh grass, attached to mussels. The oysters were very small (1-2 inches) and could only be found when the site was exposed at low tide (although the area was covered with a thin sheet of ice), as the water was very turbid.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments composed of sand were observed out to 0.25 miles in all directions from the nominal site center.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - Petite PONAR grab (while wading) and Kynar coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - UPSHUR BAY, QUINBY INLET, VA

**SITE CODE** - QIUB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 37° 31.50' N

75° 42.83' W

**LOCATED ON NOAA CHART** - 12210

**SITE ACCESS** - This site can only be accessed by boat, and should be sampled at low tide so as to facilitate the hand collection. Follow Hwy. 13 south down through Maryland and into Virginia, turn left onto Hwy. 182 (east) and drive to Quinby. Turn right onto Hwy. 606 past the Post Office and drive to the harbor where there is a boat ramp.

**SITE DESCRIPTION** - The site is accessed from Quinby, via the channel into Upshur Bay. The site is located at the green channel marker "9".

#### **BIVALVE COLLECTIONS**

1995 Oysters were very scarce in the entire area, with only a few medium sized oysters being available for sampling. There was a great deal of spat. The true site location should probably read - 37° 31.47' N, 75° 42.97' W.

1996 The nominal site center was moved by about 200 m east to a small oyster reef. The oysters were still scarce, and occurred in clumps of mainly dead oysters.

1997 No Collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected just to the west of the small oyster reef and next to the previous years sampling site.

1997 No Collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW



## NORTH CAROLINA SITES

**SITE** - JOHN CREEK, ROANOKE SOUND, NC

**SITE CODE** - RSJC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 35° 53.39' N

75° 38.02' W

**LOCATED ON NOAA CHART** - 12204

**SITE ACCESS** - This site is accessed by boat launched at the boat ramp under the western end of the Washington Baum Bridge. From Camden, in North Carolina, follow Hwy. 158 south to Nags Head. Take Hwy. 64/264 over the Washington Baum Bridge. The public ramp is under the south side at the west end of the bridge. Pirates Cove Yacht Club is on the north side of the road/bridge. Follow the channel out to the red marker "4", and the site will be 75 m due west.

**SITE DESCRIPTION** - The site is located at the mouth of John Creek, into the Roanoke Sound Channel. This is about 0.25 mi south of the west end of the bridge. The stations were not differentiated due to the size of the reef.

### BIVALVE COLLECTIONS

1995 Medium sized oysters were fairly common in the area, with a tremendous amount of fresh "dead" shells also being present.

1996 No collection.

1997 Medium sized oysters were rare with approximately one oyster retrieved per dredge. Each dredge sample mainly contained oyster hash.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 No collection.

1997 No collection. Though fine grain sediments can be found at the mouth of John Creek.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediments - N/A

**WATER DEPTH** - subtidal, -1.0 m MLLW

**SITE** - CAPE HATTERAS, PAMLICO SOUND, NC

**SITE CODE** - PSCH

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 35° 12.17' N

75° 42.97' W

**LOCATED ON NOAA CHART** - 11555

**SITE ACCESS** - This site is a walk-up, with relatively easy access following a short walk. Follow Hwy. 158 south from Nags Head to Rd. 12, then along the Cape Hatteras National Seashore and into Cape Hatteras. At the end of the road there will be a US Coast Guard Station on your right, park in the Atlantic Ocean View Area on the left. From here, walk down the sand road about 0.75 mi and take the first sand road to your right. This road dead ends into the bay; turn left here and walk along the shoreline/beach for about 100 m to the site.

**SITE DESCRIPTION** - The site is located on the inshore side of the barrier island. The stations were not differentiated due to the lack of oysters and good local landmarks.

#### **BIVALVE COLLECTIONS**

- 1995 The few small oysters were scattered along the shoreline in small clumps. All of the oysters had very thin shells.
- 1996 The weather conditions were freezing when the samples were collected. The small to medium oysters were all found under a three-quarter inch thick layer of ice.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - WY SOCKING BAY, PAMLICO SOUND, NC

**SITE CODE** - PSWB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 35° 24.74' N

76° 02.38' W

**LOCATED ON NOAA CHART** - 11555

**SITE ACCESS** - The site can be accessed by boat, launched at the boat ramp in Gull Rock, next to the Gibb's General Store. From Nags Head on Bodie Island, cross over the Roanoke Sound on the Washington Baum Bridge (Hwy. 64/264) and then take Hwy. 264 south to Lake Landing. Take a left here on Landing Rd. and head the 4 mi south to where the road makes a sharp right turn towards Gull Rock. The boat ramp is right there next to the general store (there is no name on the store front). Follow the channel from the boat ramp to where it forms a "T", turn right (south) into the main channel that will take you out into Wysocking Bay. Boats can also be launched in Engelhart.

**SITE DESCRIPTION** - The site is in Wysocking Bay, near the red channel marker "6". The area is fairly shallow and the reef is not well defined. The stations were not differentiated as the oysters were scattered and few in number.

#### **BIVALVE COLLECTIONS**

1995 The oysters were very scarce and generally less than 6 cm in length. They all occurred as singles and were covered with sea-squirts.

1996 No collection.

1997 Oysters were still scarce.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Fine grained sediments collected.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - modified Young van Veen grab and Kynar coated scoop

**WATER DEPTH** - subtidal, -3.0 m MLLW

**SITE** - PUNGO RIVER, PAMLICO SOUND, NC

**SITE CODE** - PSPR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 35° 17.76' N

76° 29.35' W

**Sediment site center** - 35° 18.94' N

76° 27.07' W

**LOCATED ON NOAA CHART** - 11548

**SITE ACCESS** - This site has to be accessed by boat, from the boat ramp at the end of Oyster Creek Rd. From Hwy. 70 in New Bern, take Hwy. 55 east to Bayboro. Then follow Hwy. 304 east towards Hobucken, then turn left onto the Lowland Rd. (Rd 1230) and then turn left again onto Horne Rd. (Rd 1234). Follow Horne Rd. to Oyster Creek Rd. and drive to the end where there is an Oyster Plant. The ramps are located just before the Plant, the middle one is the best to use. From the boat ramp, follow the markers down the channel to green channel marker "1", then go east around Pamlico Point and south to the site in Mouse Harbor.

**SITE DESCRIPTION** - The site is now located in Mouse Harbor, just off Hogpen Point, in a public oyster bed. The bed is at the edge of a marshland and the area has numerous fairly shallow banks in the bay.

#### **BIVALVE COLLECTIONS**

- 1995 The old site was searched unsuccessfully for oysters, then the general area was searched and the site moved to Hogpen Point. The small oysters were very scarce, and were scattered throughout the area covered with sea-squirts.
- 1996 No collection.
- 1997 No living oysters found at the current site location or at the site center provided in NOAA Technical Memorandum NOS ORCA 70.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected in the area of 1986 site location (35° 18.94' N, 76° 27.07' W). Muds were found in deeper areas surrounded by mostly sandy areas.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge  
Sediments - van Veen grab and Kynar coated scoop

**WATER DEPTH** - subtidal, -2.0 m MLLW

**SITE** - NEUSE RIVER, PAMLICO SOUND, NC

**SITE CODE** - PSNR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 35° 05.38' N

76° 31.74' W

**LOCATED ON NOAA CHART** - 11553

**SITE ACCESS** - The site can only be accessed by boat, and the oysters collected by dredging. From New Bern, follow Hwy. 55 east to Bayboro, then southeast towards Oriental. Turn left onto Rd. 1322 towards North Trent, after 1.5 mi turn left again onto Rd 1321. Follow the road to Rd 1325 (Brown's Creek) and turn right and drive towards Whortenville. Turn right onto the old Lumpton Rd. (Rd 1326) and drive to the end where the Slades Grocery Store is located along with the boat ramp. From the ramp, travel down the channel out to red channel marker "4". The site is another 0.75 mi to the southeast in 18 - 20' of water.

**SITE DESCRIPTION** - The site is located to the east of Piney Point, in Pamlico Sound. The reef is about 20' underwater, and is surrounded by water that is 22 - 24' deep. Muddy sediments exist in the deeper water with the oyster reef rising out of this. This is not an easy reef to find. The stations were not differentiated due to the size of the reef, and to the scarcity of the oysters.

#### **BIVALVE COLLECTIONS**

- 1995 The small oysters were all very scarce, and occurred in clumps that were covered with lots of spat.
- 1996 No collection.
- 1997 Small to medium oysters. Only Mussel Watch Project site in Pamlico Sound with what appeared to be a viable oyster population.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected adjacent to the oyster reef.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge
- Sediments - modified Young van Veen grab and Kynar coated scoop

**WATER DEPTH** - subtidal, -5.0 m MLLW

**SITE** - PIVERS ISLAND, BEAUFORT INLET, NC

**SITE CODE** - BIPI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 34° 43.10' N

76° 40.53' W

**LOCATED ON NOAA CHART** - 11545

**SITE ACCESS** - This site is a walk-up site. Follow U.S. 70 east from Beaufort, NC, until you see the NOAA Research Lab. Turn right off the highway and cross over a small bridge. Take the first road to the left after the bridge and park in the NOAA parking lot. Obtain access permission from NOAA officials before sampling the site, which is located under the bridge.

**SITE DESCRIPTION** - The samples are collected from the concrete pilings and rubble under the bridge. The discrete stations are some 10 m apart.

#### **BIVALVE COLLECTIONS**

1996 Small to medium sized oysters were abundant throughout the area. They occurred in clumps on the concrete pilings and rubble under the highway bridge.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1996 The dark brown silty sediment sample was collected from under the highway bridge near the NOAA Research Laboratory.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - BATTERY ISLAND, CAPE FEAR, NC

**SITE CODE** - CFBI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 33° 54.95' N

78° 00.21' W

**LOCATED ON NOAA CHART** - 11537

**SITE ACCESS** - This site is an easy site to sample by hand, but has to be accessed by boat. Follow Hwy. 70 all the way south into Southport, make a right turn at the bank and drive to the boat ramps and marina at the end of the road.

**SITE DESCRIPTION** - The site is visible from the ramp, and is located at the northeastern corner of Battery Island. This site can easily be collected by hand at low tide, or by using a dredge at high tide. Samples were collected on the northern tip of the island, on the spit.

#### **BIVALVE COLLECTIONS**

- 1995 Medium sized oysters were abundant throughout the area, occurring in clumps. There was a great deal of shells well throughout the area.
- 1996 The oyster population was very poor this year. The small oysters were found in large clumps of mainly dead shell.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The sediment sample consisted of a very fine-grained sand with some silt.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

## SOUTH CAROLINA SITES

**SITE** - LOWER BAY, WINYAH BAY, SC

**SITE CODE** - WBLB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 33° 14.60' N

79° 11.83' W

**LOCATED ON NOAA CHART** - 11532

**SITE ACCESS** - From boat ramp on the ICCW, head north approximately 1 mi to Winyah Bay, at the cut proceed at a heading of 140 degrees for approximately 3.0 mi straight out to the site. The site is located between the Red Channel Marker "16" and Green Channel Marker "17", which is further to the northeast. Care should be taken here, as there are some very strong currents in this area of the bay when the tide is going out.

**SITE DESCRIPTION** - The site is next to two small islands, that have the tops of partially submerged power poles sticking out of the water next to them. Due to the scarcity of oysters, this site was collected as a composite site and the stations were not differentiated.

### BIVALVE COLLECTIONS

1995 No collection.

1996 The small oysters were very scarce and in a very poor condition. There was evidence suggesting a recent die-off, with lots of fresh dead shells. There was also a good crop of spat present.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The sediment sample was a soft brown clay, with some silt.

1997 No collection.

### SAMPLING METHODS

Bivalves - hand

Sediments - hand held stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - NORTH BAY, SANTEE RIVER, SC

**SITE CODE** - SRNB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 33° 10.10' N

79° 14.50' W

**LOCATED ON NOAA CHART** - 11532

**SITE ACCESS** - This site has to be accessed by boat and the samples collected using a dredge. Head south down Hwy. 17, south of Georgetown, and turn left onto South Island Rd. Travel for about 5 mi to the end of the road where there is a Ferry, and the boat ramps are on your left. Follow the Intercoastal Waterway to the Esterville Minum Cut and on to the red channel "4". Bear left (south) through the channel and on for about 1.5 mi to the southeast to the site.

**SITE DESCRIPTION** - The site is located in the North Santee Bay, just off the mouth of Beach Creek.

#### **BIVALVE COLLECTIONS**

1995 The medium sized oysters were abundant throughout the area. There was also a great deal of shell.

1996 The oyster population was very poor this year. The oysters were mainly medium sized, with lots of dead shell present.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected at 33° 10.36' N and 79° 74.61' W, and was comprised of a dark grey clay with some brown silt.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, -3.0-4.0 m MLLW

**SITE** - FORT JOHNSON, CHARLESTON HARBOR, SC

**SITE CODE** - CHFJ

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 32° 45.03' N

79° 54.02' W

**LOCATED ON NOAA CHART** - 11524

**SITE ACCESS** - Go west on Hwy. 17 in Charleston, then take Hwy. 171 south. Turn left (east) onto Harbor View Rd. and continue on to Fort Johnson Drive. Turn left again and follow Fort Johnson Drive until it enters the Fort Johnson park area.

**SITE DESCRIPTION** - The site is located due north of Building 5 (Marshlands House), that houses the U.S. Fish and Wildlife Service, in the grass beds along the shoreline of Charleston Harbor.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The oysters were all very small and very scarce. Some of the sampled oysters were left in clumps, as it was not easy to separate the fragile shells in the field.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark brown silty clay sediment sample was collected from an intertidal depression in the grass beds.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - hand and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - SHUTES FOLLY ISLAND, CHARLESTON HARBOR, SC

**SITE CODE** - CHSF

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 32° 46.41' N

79° 54.73' W

**LOCATED ON NOAA CHART** - 11524

**SITE ACCESS** - Follow Hwy. 17 into Charleston and cross over the Ashley River bridge. Take the first exit onto Lockwood Drive and head south. The Lockwood Marina is located approximately 0.5 mi down on the right, and has a number of excellent boat ramps. From the boat ramp, follow the channel southeast into Charleston Harbor, and then east out to Shutes Folly Island.

**SITE DESCRIPTION** - The site is located on Shutes Folly Island, where the Castle Pinckney is located. Other landmarks include the USS Yorktown to the north of the site, and downtown Charleston, which is visible to the west.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The oysters were located in one general area on the island, just to the north of the castle. Most of the oysters were found in small clumps, attached to the shells of Horse Mussels.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was a dark brown sticky mud, with some silt.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - hand held stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

## GEORGIA SITES

**SITE** - TYBEE ISLAND, SAVANNAH RIVER ESTUARY, GA **SITE CODE** - SRTI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 32° 00.99' N 80° 52.95' W

**LOCATED ON NOAA CHART** - 11512

**SITE ACCESS** - This site is a walk-up and is best sampled by hand at low tide. From Savannah, follow Hwy. 80 towards Tybee Island for about 17 mi. After you cross the Lazaretto Creek bridge, take the first road to the left (opposite the Lazaretto Creek Marina sign). This road will dead end after about 0.25 mi into the Lazaretto Creek, park next to the old wooden buildings. From here, walk down the creek and along the shore about 0.25 mi towards the red channel marker "2".

When water covers the grass beds the oysters are difficult to find. It is recommended that sampling be done at low tide.

**SITE DESCRIPTION** - The site is located on the northern side of Tybee Island, at the edge of the Tybee Rd. Channel. The area is surrounded by *Spartina alterniflora* marshland. The three stations were not differentiated due to the scarcity of the oysters along the shoreline.

### BIVALVE COLLECTIONS

- 1995 The oyster population was very scarce, with only a few small oysters being found in clumps.  
1996 No collection.  
1997 As in the previous sample year, the oyster population was very scarce, with only a few small oysters being found in clumps among the grass. Size was 3-10 cm.

### SEDIMENT COLLECTIONS

- 1995 No collection.  
1996 No collection.  
1997 No collection.

### SAMPLING METHODS

Oysters - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.2 m MLLW

**SITE** - SAPELO ISLAND, SAPELO SOUND, GA

**SITE CODE** - SSSI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 31° 23.57' N

81° 17.28' W

**LOCATED ON NOAA CHART** - 11507

**SITE ACCESS** - This site can only be accessed by boat, and can only be successfully sampled by hand at low tide. Sampling at high tide with a dredge is not an option. Follow I-95 south from Savannah to Exit 10, and then go east to Darien. In Darien, take Rd 99 north towards Ridgeville. In Ridgeville, take the first right (large blue house) and follow the road until it dead ends at the McIntosh Rod and Gun Club where there is a boat ramp and hoist. The ramp is useless at low tide, as it is high and dry. From the ramp proceed down the North River to the ICWW, at red channel marker "182". The Black River is directly across the ICWW from here, and this will lead you out into Doboy Sound. The old lighthouse is visible 1.4 mi away, at a bearing of 30°. Note there are many sand bars and various confusing cuts in the north part of the river when traveling to the site.

**SITE DESCRIPTION** - The site is located on the north side of Doboy Sound on Sapelo Island, nearby the old lighthouse. Station 1 is located on the shoreline to the east of the lighthouse, and just west of Deans Creek, Station 2 is 100 m closer to the lighthouse and Station 3 is opposite the lighthouse.

#### **BIVALVE COLLECTIONS**

- 1995 Oysters were extremely abundant throughout the area, along with huge piles of dead shell. They were generally small to medium in size.
- 1996 No collection.
- 1997 Oysters ( 4-10 cm) were abundant throughout the area, with station 2 having slightly less.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.2 m MLLW

**SITE** - WOLFE ISLAND, ALTAMAHA RIVER, GA

**SITE CODE** - ARWI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 31° 19.45' N

81° 18.65' W

**LOCATED ON NOAA CHART** - 11507

**SITE ACCESS** - This site can only be accessed by boat, and can only be successfully sampled by hand at low tide. Sampling at high tide with a dredge is not an option. Follow I-95 south from Savannah to Exit 10, and then go east to Darien. In Darien, take Rd 99 north towards Ridgeville. In Ridgeville, take the first right (large blue house) and follow the road until it dead ends at the McIntosh Rod and Gun Club where there is a boat ramp and hoist. The ramp is useless at low tide, as it is high and dry. From the ramp proceed down the North River to the ICWW, at red channel marker "182". Follow the ICWW to the north until you come to red channel marker "198". The site lies 0.5 mi at a bearing of 35° from the marker.

**SITE DESCRIPTION** - The site is located in the Altamaha River on the southern side of Wolfe Island. There are no really good landmarks in the area other than the navigation marker. There is a six foot high wall of dead oyster shell along the bank next to the site. The stations were not differentiated due to the scarcity of oysters in the entire area.

#### **BIVALVE COLLECTIONS**

1995 There were only a very few small oysters to be found in the entire area. Few spat were observed, with lots of dead shell.

1996 No collection.

1997 Oysters were scarce. Size was 3-12 cm found in clusters, with lots of dead shell.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.2 m MLLW

## FLORIDA SITES - Atlantic Coast

**SITE** - CHICOPIT BAY, ST. JOHNS RIVER, FL

**SITE CODE** - SJC B

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 22.86' N

81° 26.40' W

**LOCATED ON NOAA CHART** - 11489

**SITE ACCESS** - This site is a walk-up site that is best sampled at low tide. From I-95 in Jacksonville, go east on Hwy. 202 (J. Turner Butler Blvd.) and then north on Hwy. A1A to the Mayport Ferry at the Little Jetties Park. Note : A1A goes north for about 5 mi, then turns west onto Atlantic Blvd. for about a mile and then north again at Mayport. A1A divides at a "Y", keep left on Mayport Rd. The Little Jetties Park separates the St. Johns River from Chicopit Bay. Tidal change is rapid and covers the oysters making finding them difficult. Best sampled at low tide.

**SITE DESCRIPTION** - The site is located on the south side of the St. Johns River, on a small promontory leading out to the park. A site landmark is a public jetty. Station 1 lies south of the public jetty next to Ferry Rd., Station 2 is 50 m due west and Station 3 is another 75 m west of Station 2.

### BIVALVE COLLECTIONS

- 1995 Medium sized oysters were abundant throughout the area, and easily collected by hand at low tide.
- 1996 No collection.
- 1997 Oysters were numerous in the 6-15 cm size range and found in clumps.

### SEDIMENT COLLECTIONS

- 1995 No collection.
- 1996 No collection.
- 1997 Sediment were co-located with the oysters. Texture was a sandy/silty mud, brown to dark grey in color, without odor.

### SAMPLING METHODS

- Oysters - hand
- Sediments - hand, scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - CRESCENT BEACH, MATANZAS RIVER, FL

**SITE CODE** - MRCB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 45.84' N

81° 15.71' W

**LOCATED ON NOAA CHART** - 11485

**SITE ACCESS** - This site is best sampled by hand at low tide. From I-95 or Hwy. 1 south of St. Augustine, take Rt. 206 east towards the Matanzas River/ICWW bridge. Just before you cross the bridge, turn right and drive to the end of the dirt road.

**SITE DESCRIPTION** - The site is located south of the Matanzas River bridge, on the western shoreline. Station 1 is to the south of the promontory, Station 2 lies at the eastern tip and Station 3 lies on the northwest side of the spit. Station 3 lies due south of the 7th set of bridge pilings.

#### **BIVALVE COLLECTIONS**

1995 The small oysters were very scarce across the entire site.

1996 No collection.

1997 Oysters were large (6-10 cm) and abundant at station 3, smaller (3-8 cm) and scarce at stations 1 and 2 .

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.2 m MLLW

**SITE** - SEBASTIAN RIVER, INDIAN RIVER, FL

**SITE CODE** - IRSR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 49.77' N

80° 28.46' W

**LOCATED ON NOAA CHART** - 11472

**SITE ACCESS** - This site is a walk-up and best sampled by hand at low tide. Follow Hwy. 1 south from Melbourne and take the Indian River Drive over the Sebastian River. The site is 1.5 mi south of the bridge, on the left hand side of the road at the Floodtide Marina.

**SITE DESCRIPTION** - This site was moved 0.25 mi further south, in 1995. The site is now next to an old crab and fish processing plant which has a small wooden jetty. All three stations were collected within 7 m of the jetty, as the land is all privately owned.

#### **BIVALVE COLLECTIONS**

1995 Large and medium sized oysters were abundant throughout the area.

1996 No collection.

1997 Oysters were sparse and occurring in clumps. Many dead and empty shells were at the site. Collected organisms were in the 4-13 cm size range.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected by hand from the soft bottom areas between the oyster banks. Texture was a sandy silt with some shell hash. Color was dark brown to black.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - hand, scoop

**WATER DEPTH** - intertidal, +0.2 m MLLW

**SITE** - MAULE LAKE, NORTH MIAMI, FL

**SITE CODE** - NMML

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 25° 56.26' N

80° 08.98' W

**LOCATED ON NOAA CHART** - 11467

**SITE ACCESS** - This walk-up site is best sampled by hand at low tide. The site is just off Hwy. 1, between 172nd and 178th Streets at the concrete bridge (marked 1834). Maule Lake Marina is 0.25 mi to the south, and Total Marine is about 50 m to the north, where there is adequate parking.

**SITE DESCRIPTION** - The site is in the canal next to the bridge, on the east side. There are three white and one gray (larger) pipelines that cross the canal next to the bridge. The stations were not differentiated due to the small size of the collection area.

#### **BIVALVE COLLECTIONS**

1995 Oysters of all sizes were abundant throughout the site.

1996 No collection.

1997 Oysters were numerous and found in clumps along the bottom and attached to concrete bulkheads. Collected size was 4-8 cm.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 The entire area was searched for fine grain sediments. Tidal scouring washes the bottom of fines thoroughly. Black sand sediments with organic detritus and some shell hash were collected from the concrete bulkheaded area about 75 m SE of the bridge in water depth of 1.5 m.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - box core and stainless steel scoop

**WATER DEPTH** - intertidal, +0.1 m MLLW

**SITE** - GOULD'S CANAL, BISCAYNE BAY, FL

**SITE CODE** - BBGC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 25° 32.00' N

80° 19.39' W

**LOCATED ON NOAA CHART** - 11462

**SITE ACCESS** - This site has to be accessed by boat, but can be easily sampled by hand at low tide. The site is located in the Biscayne National Park, and an additional permit is required from the National Parks Service to legally work within the park boundaries. From Miami, go south on Hwy. 1 towards Homestead and turn left onto Coconut Palm Drive (Rt. 248), next to the Amoco Station in Gould's. Cross over Allapattah Rd. and the highway will divide, keep to the left and the road will end at the marina. From the boat ramp, follow the channel about 0.25 mi down to the Biscayne Bay breakwaters.

**SITE DESCRIPTION** - The site is located on the southern breakwater. Station 1 is about 200 m before the green channel marker "27", with an adjacent large I-beam protruding from the water. Station 2 is located some 75 m before the marker on a large piece of coral, and Station 3 is at the channel marker.

#### **BIVALVE COLLECTIONS**

1995 The oysters were all very small and very scarce.

1996 No collection.

1997 Oysters were extremely rare (very scarce) and found attached to the limestone rock. Those collected were small (2-6 cm).

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected from the canal in approximately 3 m of water. The sediments were a dark brown silt with high organic detritus and exhibited an anaerobic smell.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - box core and stainless steel scoop

**WATER DEPTH** - intertidal, +0.2 m MLLW

**SITE** - PRINCETON CANAL, BISCAYNE BAY, FL

**SITE CODE** - BBPC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 31.13' N

80° 19.75' W

**LOCATED ON NOS CHART** - 11462

**SITE DESCRIPTION** - Oysters are found in shallow (<1 meter) water on the banks at the mouth of Princeton canal and along the peninsula on the northern side of Princeton Canal, west of the spoil islands. Water turbidity precludes efficient use of a rake or tongs, while rocks and shoals prevent effective dredging. Gloves and diving boots are useful. Snorkeling/wading is the best method for collecting oysters at this site.

Depositional "sediments," composed largely of sea grass detritus, are found only in the center of the canal between the north peninsula and the westernmost spoil island.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

**WATER DEPTH** - subtidal, - 1 m MLLW

## PUERTO RICO SITES

**SITE** - BAHIA DE BOQUERON, PUERTO RICO, PR

**SITE CODE** - PRBB

**TARGET SPECIES** - *Crassostrea rhizophorae*

**NOMINAL SITE CENTER** - 18° 00.47' N

67° 10.51' W

**LOCATED ON NOAA CHART** - 25675

**SITE ACCESS** - The site is only accessible by small boat, these are available for rent in the town of Boqueron. To reach the site, travel from the boat dock in Boqueron across Bahia de Boqueron (Boqueron Bay) on a course of 150° to the entrance of Canõ Boqueron. Go into the small bay and turn to a heading of 50° and proceed towards the northeast side of the bay. All three stations are located within the small bay system on the south side of Boqueron Bay.

**SITE DESCRIPTION** - The site is located in Canõ Boqueron, along the north shoreline to the west of the Marine Police Station. The individual Stations were located some 50 m apart along the shore, with Station 1 being to the east (about 100 m west of the Marine Police Station) and Station 3 to the west.

### OYSTER COLLECTIONS

1995 No collection.

1996 There is a good population of small Caribbean oysters (*Crassostrea rhizophorae*) growing on the roots of the red mangroves. The population is declining according to local sources, as there is a growing tourist demand for fresh oysters. Care should be taken when collecting the sample, as a second species of oyster is also present in large numbers - the Flat Tree Oyster (*Isognomon alatus*).

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The soft gray-brown silty sediment sample was collected from 18° 00.43' N and 67° 10.46' W, in 2 m of water. This location is just off the shoreline from Station 2.

1997 No collection.

### SAMPLING METHODS

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.0 - 0.25 m

**SITE** - BAHIA MONTALVA, PUERTO RICO, PR

**SITE CODE** - PRBM

**TARGET SPECIES** - *Crassostrea rhizophorae*

**NOMINAL SITE CENTER** - 17° 58.26' N

66° 59.37' W

**LOCATED ON NOAA CHART** - 25671

**SITE ACCESS** - This site is a walkup site and is reached by automobile. Travel from the La Parguera area, north on Hwy. 304 to Hwy. 324. Take Hwy. 324 east towards Ensenada, past the Hwy. 323 turn off. Continue on for approximately 250 m on Hwy. 324, to the first dirt road past the white house with pink roof trim. Turn right and follow the dirt road past the pole barn with the rusty roof, and across the salt pond to the edge of Bahia Montalva (Montalva Bay).

**SITE DESCRIPTION** - In previous years, all three stations were located along the north shoreline. Sampling began directly south of the pole barn adjacent to the boat anchoring area. The oysters were all attached to the roots of red mangroves, rubble and wooden pilings along the shoreline.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 This site was devoid of live oysters this year. An extensive search was made of the shoreline to the east and west of the site, and only a few dead Caribbean Oyster shells were found. Only a few live tree oysters were noted during the search.

1997 No collection

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The gray-brown silty sediment sample was collected some 15 m south of the nominal site center, in 1 meter of water.

1997 No collection

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - intertidal, 0.2 m

**SITE** - BAHIA DE JOBOS, PUERTO RICO, PR

**SITE CODE** - PRBJ

**TARGET SPECIES** - *Crassostrea rhizophorae*

**NOMINAL SITE CENTER** - 17° 56.35' N

66° 10.88' W

**LOCATED ON NOAA CHART** - 25687

**SITE ACCESS** - This site is located in the east end of Bahia de Jobos (Jobos Bay) and can only be reached by boat. To reach the boat anchorage, proceed down Hwy. 7710 from Puerto Jobos toward Pozuelo and go to the second small bay on the right, where there are numerous small boats anchored (there is a sign at the turn - Asociacion De Pescadores Independientes, Inc.). There are also a few fishing boats located in the first bay, next to the small "Cafe". By boat, go through the mangroves north into the bay and then turn east. Proceed to the east end of the Bahia de Jobos, and then into the inlet into Laguna de las Mareas.

**SITE DESCRIPTION** - Oyster collections occurred at the east end of Bahia de Jobos. The oysters were found growing on the roots of red mangrove trees. Turtle and manatee grass was abundant throughout the bay, starting near the edge of the mangrove roots. An obvious landmark is the electric power station at Aguirre, located at the west end of the bay.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 The Caribbean Oyster population is in a decline, due to the heavy demands made by the tourist industry for fresh oysters. There was a fairly good population of tree oysters in the area.

1997 No collection

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The soft silty gray brown sediment sample was collected at the nominal site center, in about 2 m of water.

1997 No collection

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.1 - 0.2 m

## FLORIDA SITES - Gulf Coast

**SITE** - BAHIA HONDA KEY, FLORIDA KEYS, FL

**SITE CODE** - BHKF

**TARGET SPECIES** - *Chama sinuosa*

**NOMINAL SITE CENTER** - 24° 39.67' N

81° 16.38' W

**LOCATED ON NOAA CHART** - 11445

**SITE ACCESS** - The site is accessed off Hwy. 1, in the Bahia Honda Recreation Area. This bivalve collection site is located directly north of the entrance to the Park, and can be reached by walking along the shoreline. The sediment collection site has to be accessed by small boat.

**SITE DESCRIPTION** - There are no American oysters present in the area, therefore an alternate bivalve, the Smooth-edge Jewel Box (*Chama sinuosa*), of the family Chamidae, is collected for analysis. The bivalves are found attached to the edge of the vertical face of a hard carbonate wall, which is on the northeast side of a U-shaped cove. All three stations are collected along the carbonate wall, quarried for highway construction. The site is easily accessible from the shore, and best sampled using a mask and snorkel.

### OYSTER COLLECTIONS

1995 No collection.

1996 This site was sampled as a composite site, as there were very few of the bivalves to be found in the area.

1997 No collection

### SEDIMENT COLLECTIONS

1995 No collection. The sediment collection site is along the mangrove shoreline 0.65 mi to the east of the bivalve sites, at latitude 24° 40.17' N and longitude 81° 15.90' W.

1996 No collection.

1997 No collection

### SAMPLING METHODS

Oysters - hand

Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - JOE BAY, FLORIDA BAY, FL

**SITE CODE** - FBJB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 25° 12.73' N

80° 32.04' W

**LOCATED ON NOAA CHART** - 11451

**SITE ACCESS** - The boat can be launched in south Florida Bay, at the Key Largo Ranger Station. To reach the Ranger Station, proceed down Hwy 1 to mile marker 98.7. The Ranger Station is on the right hand side of the road, and the boat ramp is behind the station. The ramp is a rough coral one, which is adequate for small boats. The oyster site is approximately 10 mi away; follow a heading of 330° to the marked channel into Joe Bay.

**SITE DESCRIPTION** - The original site is situated along the cut into Joe Bay, and along the eastern side of Joe Bay. Station 1 is located within the cut into Joe Bay, Station 2 is located within Joe Bay along the eastern shoreline ~ 50 m north of Station 1, and Station 3 is located approx. 50 m north of Station 2 along the same shoreline. The oysters are all attached to mangrove roots. The area is a closed to the public, as it is an American crocodile breeding ground.

#### **OYSTER COLLECTIONS**

- 1995 No oysters were found at any of the original stations, as there had been excessive fresh water flooding further north in the Everglades, resulting in a localized oyster die-off. A new oyster site was found some 200 m further to the south, next to the tide-gauge at a small island in Trout Cove (25° 12.97' N, 80° 31.99' W). Station 1 oysters were collected from the tide-gauge pilings, Station 2 oysters from mangrove roots just south of Station 1 and Station 3 oysters were collected from mangrove roots about 50 m west of Station 1. There were very few live small to medium sized oysters to be found in the area, growing on the mangrove roots.
- 1996 There were very few live oysters to be found in the area around the tide gauge, they were mainly small in size with a few mediums as well.
- 1997 The scarcity of oysters required a very long search. Those found were very small (1-5 cm), while most were not over 2 cm.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - FLAMINGO, FLORIDA BAY, FL

**SITE CODE** - FBFO

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 25° 08.47' N

80° 55.42' W

**LOCATED ON NOAA CHART** - 11451

**SITE ACCESS** - The boat can be launched at the Flamingo Marina Bay Side boat ramp in Flamingo City, in the Everglades National Park. To reach the ramp, take Florida Hwy. 9336 west from Homestead, towards the Everglades National Park. Once in the Park, follow the main road to the visitors center in Flamingo.

**SITE DESCRIPTION** - The site is located within and just outside the small boat basin. The stations are all within 100 m of each other, and can be collected by hand at low tide. Station 1 is located within the boat basin next to the Florida Bay boat ramp. The oysters were collected by hand from the boat - along the concrete bulkheads and wooden pilings. Station 2 is located ~ 100 m south of Station 1, in the outside small boat basin surrounded by tall concrete walls. The oysters were taken by hand from the northeast wall by the Visitors Center. Station 3 is located approximately 80 m southwest of Station 2, along the opposing wall and rock area. The oysters were attached to the rocks and wall. The oysters may be hard to spot, due to the heavy algae growth along the rocks and concrete walls.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were scarce inside the small boat basin, while there was an abundance of large oysters at stations 2 and 3. The oysters were all covered by a heavy growth of barnacles.
- 1996 Oysters were very scarce at Station 1, Station 2 had a better population whilst Station 3 was heavily populated with medium sized oysters.
- 1997 Oysters again were very scarce at Station 1 but abundant at stations 2 and 3. There was a heavy encrustation of barnacles on the oysters (4-12 cm).

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - FAKA UNION BAY, EVERGLADES, FL

**SITE CODE** - EVFU

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 25° 54.14' N

81° 30.74' W

**LOCATED ON NOAA CHART** - 11430

**SITE ACCESS** - The site is accessed by driving to the Port of the Islands Resort, south of Naples, on Florida Hwy. 41, and launching a small boat at the resort marina. Proceed south along a man-made channel to Faka Union Bay. The sample site is on a mangrove island, near green channel marker "53".

**SITE DESCRIPTION** - Faka Union Bay is located in the Cape Romano-Ten Thousand Islands Aquatic Preserve. An intertidal reef surrounds a small mangrove island, 25 m north of green channel marker "53". The oysters were abundant.

#### **OYSTER COLLECTIONS**

1995 The reef is a small one, so discrete stations were not distinguished. Small to medium sized oysters were abundant, occurring in singles and clusters on the mangrove roots.

1996 There were very few live oysters to be found in the area, so the three stations were not differentiated and the sample is a composite one.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark brown silty sediment sample was collected just off the site center in the channel.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - HENDERSON CREEK, ROOKERY BAY, FL

**SITE CODE** - RBHC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 01.62' N

81° 44.33' W

**LOCATED ON NOAA CHART** - 11430

**SITE ACCESS** - The site is accessed from I-75 by driving west (or south) on Florida 951. Approximately 2.6 mi past the intersection of U.S. Hwy. 41, turn right on Shell Island Rd. Shell Island Rd. is marked by a sign for the Briggs Nature Coinsurance and Marine Research Lab. Proceed to the Rookery Monument. Go past the Rookery Headquarters and on to the boat ramp at the end of the road.

**SITE DESCRIPTION** - The site is located in Rookery Bay Aquatic Preserve, in Henderson Creek. All three oyster stations are near the mouth of the creek, in the vicinity of the Children's Monument. Station 1 is on the same shoreline as the monument, approximately 150 m to the south at the first bare reef patch in the mangroves. Station 2 is located on the shore opposite the monument, at a small cove in the mangroves, next to a manatee sign. Station 3 is located on the shoreline opposite the monument, approximately 200 m to the northeast at the bare patch in the mangroves, where the channel begins to constrict from the passage out of Henderson Reef into Rookery Bay.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of medium sized oysters growing in clumps around the mangroves. Station 1 was moved to the Children's Monument, Station 2 was located 50 m due north of the Monument and Station 3 was located a further 35 m to the north.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark black silty sediment sample was collected from around the mangroves.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand held stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - NAPLES BAY, NAPLES BAY, FL

**SITE CODE** - NBNB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 06.71' N

81° 47.11' W

**LOCATED ON NOAA CHART** - 11430

**SITE ACCESS** - The site is accessed off U.S. I-95, at the Hwy. 951 exit for Marco island. Proceed south to Hwy. 864, and then turn left onto Rattlesnake Hummock Rd. Turn right (north) onto Hwy. 41 and the left onto Thommason Rd. When Thommason road ends, go left onto Fern Rd. and then right on Danford Rd. Follow the signs to the Bayview Park boat ramp.

**SITE DESCRIPTION** - The oyster reefs are located to the east and adjacent to the red channel marker "24". The area has a number of old reefs that are primarily consolidated and cemented shell fragments. The nominal site center is around a small shell reef with a few mangroves, 50 m southeast of the channel marker. Station 1 is located around the mangroves, Station 2 is to the east of the mangroves and Station 3 is to the west of the mangroves.

#### **OYSTER COLLECTIONS**

1995 The small to medium sized oysters were found in clusters on the reef, which was built up of old shell. Very few spat were noted along with some barnacles.

1996 There was a fairly good population of medium sized oysters, occurring in clumps across the site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sand sediment sample was collected near the channel.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - BIRD ISLAND, CHARLOTTE HARBOR, FL

**SITE CODE** - CBBI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 30.86' N

82° 02.07' W

**LOCATED ON NOAA CHART** - 11427

**SITE ACCESS** - The site is off U.S. I-75. Take the Hwy. 78 exit going west. Cross over Hwy. 41 and then turn left onto Hwy. 867A (Del Prado Blvd.). Proceed south along the boulevard and continue into El Dorado. Turn left at the stop sign onto Coronado, then left again onto Lucerne. Follow the signs to the Yacht club and boat ramp. The boat launch site is at the public ramp at Red Fish Point, in Cape Coral. To reach the site, proceed west down the Calooshatchee River along the ICWW past Big Shell Island. Turn north at the red channel markers "2" and "2A". This will take you to the west of Bird Island. An alternate launch site is at the Punta Rassa Ramp.

**SITE DESCRIPTION** - The site is located in San Carlos Bay in the Matlacha Pass National Wildlife Refuge. The site is on a reef, which is directly north of Bird Island and northeast of Merwin Key. Oysters are plentiful on the subtidal portions of the reef and can be collected either by hand or with tongs. Station 1 is at the southeast end of the reef, just north of the small mangrove island. Station 2 is 100 m further northwest, and Station 3 is 100 m further north of Station 2.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were abundant across the entire reef, occurring in clusters in the subtidal portions of the reef. No spat were observed, but there were large numbers of barnacles and some mussel growing on the oysters.
- 1996 No collection.
- 1997 The small oysters (2-6 cm) were found in clusters among many dead shells.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The odorless, sandy mud was obtained in 0.5 m of water approximately 50 m north of the oyster site.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - FORT MEYERS, CHARLOTTE HARBOR, FL

**SITE CODE** - CBFM

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 33.50' N

81° 55.37' W

**LOCATED ON NOAA CHART** - 11427

**SITE ACCESS** - The site is accessed off U.S. I-75, taking the exit for Hwy. 78 and going west. Cross over Hwy. 41 and then turn left onto Hwy. 867A (Del Prado Blvd.). Proceed south along the boulevard and continue into El Dorado. Turn left at the stop sign onto Coronado, then left again onto Lucerne. Follow the signs to the Yacht club and boat ramp. The boat launch site is at the public ramp at Red Fish Point, in Cape Coral. Proceed east up the Calooshatchee River, along the ICWW to the Cape Coral Bridge. The site is at the east end of the bridge.

**SITE DESCRIPTION** - The site is located on the east end of the bridge on both sides of the highway. Small clumps of small oysters, along with clams and barnacles were attached along the base of the bridge, rip-rap and in clumps on the sand and shell bottom. Station 1 is located on the east end of the Cape Coral bridge on the northeast side. Station 2 is on the south side of the bridge and Station 3 is 100 m to the south along the rip-rap bulkhead.

#### **OYSTER COLLECTIONS**

- 1995 There were very few live oysters to be found in the entire area, as there had been a recent "kill" associated with a cold weather freeze. There were a number of barnacles and mussels along with the few small live oysters.
- 1996 No collection.
- 1997 The 2-10 cm oysters were found in abundance along rocks and walls at the water's edge.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - COCKROACH BAY, TAMPA BAY, FL

**SITE CODE** - TBCB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 40.86' N

82° 31.06' W

**LOCATED ON NOAA CHART** - 11414

**SITE ACCESS** - The site is accessed by driving to Hwy. 41 and taking the Cockroach Bay Rd. to the west. The launch ramp is at the end of the road. A shallow draft boat, with a tilt motor and jack-up plate, is required to get access to the site. The trip to the site requires winding around numerous small islands to the open bay at the east end of Cockroach Bay. Upon entering the open bay, proceed east to a very small island (mostly subtidal), near the southeast shore.

**SITE DESCRIPTION** - The site is located on an exposed reef on the south side of Cockroach Bay. Oysters were collected by hand from the subtidal portions of the reef. Neither the sediments or oyster collection stations (around the small island) can be easily differentiated geographically.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There were only a very few small to medium sized oysters to be found in the area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - HILLSBOROUGH BAY, TAMPA BAY, FL

**SITE CODE** - TBHB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 51.29' N

82° 23.68' W

**LOCATED ON NOAA CHART** - 11413

**SITE ACCESS** - The boat is launched at the ramp on the northwest corner of the Hwy. 41 bridge, over the Alafia River.

**SITE DESCRIPTION** - This site is located on the north bank of the Alafia River, to the west of the Hwy. 41 road bridge. The oyster collection stations are established along the rip-rap shoreline just to the east of green channel marker "15". Discrete stations were not occupied due to the scarcity of the oysters.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 The small to medium sized oysters were very scarce and scattered widely across the site. Due to the lack of oysters, this site was collected as a composite sample and the stations were not differentiated.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark black sediment sample was anaerobic, with a pungent odor.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - PETER O. KNIGHT AIRPORT, TAMPA BAY, FL

**SITE CODE** - TBKA

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 54.58' N

82° 27.23' W

**LOCATED ON NOAA CHART** - 11413

**SITE ACCESS** - The site is located on the south end of the Davis Islands, adjacent to the Peter O. Knight airport and the Davis Islands Yacht Club. To reach this site from St. Petersburg, take I-275 east and then take Exit 24, go south on Armenia to Swann Ave., then east to join Bayshore Blvd. Cross over the bridge to the Davis Islands. Stay on west Davis Blvd. and then exit right onto Airport then to Marinique, which follows the seawall.

**SITE DESCRIPTION** - Oysters were intertidal and were attached to the rocks of the jetty, which extends from the end of the runway into the bay. Station 1 is located along the seawall beginning at the junction of the seawall and jetty on the east side of the jetty. Station 2 is at the bay end of the jetty, and Station 3 is on the west side of the jetty, beginning at the seawall.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a reasonable population of small to medium sized oysters at the site, though the oysters were scarcer at Station 1.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The brown-gray sandy sediment sample that contained some silt was collected just off the oyster site.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - OLD TAMPA BAY, TAMPA BAY, FL

**SITE CODE** - TBOT

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 01.42' N

82° 37.97' W

**LOCATED ON NOAA CHART** - 11413

**SITE ACCESS** - To reach the site, take Hwy. 275 to Hwy. 92 west, and then take Hillsborough Ave. toward Tampa Bay Downs. Turn south on Double Branch Rd. and proceed to State St., turn left and go to the boat ramp at the end of the street.

**SITE DESCRIPTION** - Station 1 is located approximately 50 m north of the boat ramp. The reef extends underwater from east to west and is exposed at low tide. Station 2 is a small subtidal reef approximately 10 m east of the end of the boat ramp. Station 3 is 50 m southeast of the boat ramp, where the creek forks on the east side of the channel.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 The only good oyster reef in the area this year was located just to the south of the bridge. The medium sized oysters were found growing in clumps on a small exposed reef. Due to the size of the reef, the three stations were not differentiated and the sample is a composite one.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown fine-sand sediment sample contained a greenish silt, and was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - PAPYS BAYOU, TAMPA BAY, FL

**SITE CODE** - TBPB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 50.66' N

82° 36.69' W

**LOCATED ON NOAA CHART** - 11413

**SITE ACCESS** - This site can be accessed by boat or by automobile. By boat, depart the city marina in St. Petersburg and cross to the west side of Tampa Bay to Papys Bayou (approximately 30 min). An alternate boat ramp is at the Gandy Bridge Marina. The site is reached by traveling out the channel parallel to the highway to Tampa Bay, and then south to green channel marker "15", then turn west to the entrance to Papys Bayou. This ride takes approximately 20 min. To access the site by wading, drive to the Weeden Island Wildlife Refuge via Weeden Drive.

**SITE DESCRIPTION** - The nominal center of the site is an old wood and steel pier-type structure, at the end of the bayou. Station 1 oysters were collected from the mangroves at the shore end of the pier, station 3 oysters from the distal end of the pier, and station 2 oysters were from the midpoint of the pier between stations 1 and 3.

#### **OYSTER COLLECTIONS**

- 1995 The site was not scheduled to be collected this year.
- 1996 The medium sized oysters were found in clumps under the old pier.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The dark gray silty sand sediment sample was collected at the nominal site center.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - MULLET KEY BAYOU, TAMPA BAY, FL

**SITE CODE** - TBMK

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 37.25' N

82° 43.59' W

**LOCATED ON NOAA CHART** - 11411

**SITE ACCESS** - The site is accessed by automobile from the Fort DeSoto County Park on Mullet Key. To reach the site, travel down Hwy. 679 and turn right onto Anderson Blvd. Then turn right (north) on to a small shell road, north of the pier parking lot. Travel down the road, until the road ends at the waters edge.

**SITE DESCRIPTION** - The site is located in the southwest corner of Mullet Key Bayou, north of Family Fishing Pier 1. Station 1 is located 30 m from the ramp, just south of the three poles and next to the mangroves. Station 2 is located at, and to the east of, the ramp, approximately 150 m east of station 1. Station 3 is a small reef 100 m to the east of station 2, at the second mangrove point.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a very good oyster population across the entire area, with the small to medium sized oysters occurring in large clumps.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark gray clay sediment sample contained some sand, and was anaerobic in odor.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - NAVAREZ PARK, TAMPA BAY, FL

**SITE CODE** - TBNP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 47.23' N

82° 45.24' W

**LOCATED ON NOAA CHART** - 11411

**SITE ACCESS** - The site is located at the boat ramp in Navarez Park, which is located on the east side of Boca Ciega Bay, north of the Treasure Island Causeway. To reach the site, travel west on 5th Ave. and then turn north (right) onto Park St. Turn off of Park St. and go west (left) onto Elbow Lane.

**SITE DESCRIPTION** - This site is next to an old boat basin and a sand ramp that are no longer used. There are also two newer concrete ramps and a fishing pier nearby. All three stations are located south of the new boat ramps. Station 1 is along the north and east side of the boat basin. The oysters were attached to the concrete bulkhead, on rocks and debris on the bottom, and on the sandy bottom. Station 2 is 50 m to the southwest across the boat basin, on a point that juts out to the north. This site begins at the northernmost point of land, and continues south for approximately 50 m. The oysters were attached to the concrete rubble and were on the sandy bottom. Station 3 is 100 m south of station 2, on a small point of land that juts out to the west. Here, the oysters were attached to the concrete rubble.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of small to medium sized oysters in the area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sand sediment sample was collected at the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - BLACK POINT, CEDAR KEY, FL

**SITE CODE** - CKBP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 12.40' N

83° 04.17' W

**LOCATED ON NOAA CHART** - 11408

**SITE ACCESS** - The site is accessed off U.S. Hwy. 98 south. Turn west (left) onto Hwy. 24 towards Cedar Key, then north (right) onto Hwy. 347. Then turn west (left) again onto Hwy. 326 and drive to the end of the surfaced road, then proceed down the sand road to the carpark at the shell mound.

**SITE DESCRIPTION** - The site sits at the end of a small shell promontory, surrounded by marshland and mudflats. Station 1 is located 50 m west of the carpark, station 2 is 50 m south of the carpark and station 3 is 100 m east of the carpark. The oysters were found in small clusters and reefs along the edges of the mudflats. This site is very easy to sample at low tide.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were abundant throughout the area. There was a good crop of spat, along with some barnacles and mussels.
- 1996 No collection.
- 1997 The abundant oysters (4-10 cm) were found in clusters with many smaller ones in the cluster.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were collected adjacent to the oyster site, and were dark brown silty sands without odor.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - WEST PASS, SUWANNEE RIVER, FL

**SITE CODE** - SRWP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 19.75' N

83° 10.45' W

**LOCATED ON NOAA CHART** - 11408

**SITE ACCESS** - This site is accessible only by small boat, launched at the Suwannee Marina located near the middle of the town. From the boat ramp, proceed southwest to the first channel to the north. Proceed slowly up the channel which passes through Suwannee. The channel passes under a bridge then bends left, passes under another bridge and then turns left and then right. Turn north at the last house on the right into another channel and proceed until it intersects a channel with navigation markers. Proceed out to red channel marker "20" and go north for approximately 2 km to Cat Island.

**SITE DESCRIPTION** - Oysters were collected along the margins of Cat Island. There are numerous reefs east of Cat Island and they are all exposed at low tide. The margins of the islands are covered with *Spartina alterniflora*. Station 1 is located on the northeast shore of Cat Island, between a topless palm and a pole in the water. At low tide, the reef is exposed and oysters can be collected by hand or tonged from the deeper water. Station 2 is a subtidal reef with an exposed intertidal portion. It is located between Cat Island and a small island to the northeast. Station 3 is about 50 m north of station 1, on the north side of the same reef.

#### **OYSTER COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - SPRING CREEK, APALACHEE BAY, FL

**SITE CODE** - AESP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 03.80' N      84° 19.32' W

**LOCATED ON NOAA CHART** - 11405

**SITE ACCESS** - To reach the site, turn right off of U.S. Hwy. 98 east onto Hwy. 375. Then turn right again (south) onto Hwy. 365 and drive to the end of the road. The Spears Seafood Company, at the end of the road, has a boat ramp that can be used with permission. Proceed out down the marked channel to the site.

**SITE DESCRIPTION** - This site is located on the west side of Apalachee Bay, where Spring Creek enters Oyster Bay. The sampling stations are located in the midst of a very prolific reef area. The nominal site center is located along an "S"-shaped reef, 300 m south of channel markers "31" and "32", and northwest to southwest of channel markers "29" and "30".

#### **OYSTER COLLECTIONS**

1995 Small oysters were abundant across the entire length of the reef. Only a few spat were seen, along with some mussels.

1996 No collection.

1997 The oysters were numerous, small, and found in clumps.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 The sediments were dark brown silty sand without odor. They were collected at a depth of 2 m in the channel adjacent to the oyster reef.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - CAT POINT BAR, APALACHICOLA BAY, FL

**SITE CODE** - APCP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 43.45' N

84° 53.05' W

**LOCATED ON NOAA CHART** - 11404

**SITE ACCESS** - This is a walk-up beach site, best done at low tide. It can be accessed by boat, when the tides are high. To reach the site from Hwy. 98, drive south on road G1A towards the toll booth. Turn left (east) on the dirt road to East Point Beach, just before the bridge toll booths. Park and walk to the East Point Beach, where the oysters can be picked up by hand at low tide. If the tide is high, the boat can be launched at one of the ramps on Hwy. 30, which is to the north-east of the site.

**SITE DESCRIPTION** - The site is located just to the east of Cat Point. The reef is exposed at low tide and is the major source for oysters in eastern Apalachicola Bay. At high tide the oysters can be collected by tonging, as oyster dredges are not permitted in Apalachicola Bay. Station 1 oysters were collected from the old bridge pilings, just to the east of the toll bridge, station 2 oysters 100 m to the north-northeast of the bridge, and station 3 oysters were collected a further 100 m to the north-northeast.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were abundant at the first station, whereas the other stations had medium to large sized oysters present in good numbers. The oysters all occurred in clusters.
- 1996 No collection.
- 1997 Oysters in the 3-6 cm size range were abundant. Algae and some mussel attachment was noted.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The dark brown silty sands, mixed with some clay and detritus were collected adjacent to the oyster site.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - DRY BAR, APALACHICOLA BAY, FL

**SITE CODE** - APDB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 40.35' N

85° 03.94' W

**LOCATED ON NOAA CHART** - 11402

**SITE ACCESS** - The site is accessed by a 30 min boat ride originating at the boat ramp in Apalachicola, near the southwest end of the John Gorrie Memorial Bridge. Proceed west along the inside channel to the first channel going south into Apalachicola Bay. Run a compass course (bearing 250° ) about 7 mi to the northeast end of St. Vincent Island, at St. Vincent Point.

**SITE DESCRIPTION** - The site was located on the northeast corner of St. Vincent Island, at St. Vincent Point. The oysters were located north of the point, on an intertidal shell and sand reef. Station 1 is about 300 m east of the point on the reef, station 2 a further 100 m northeast and station 3 yet another 100 m to the northeast.

#### **OYSTER COLLECTIONS**

- 1995 Medium to large sized oysters were abundant along the length of the reef, occurring in singles and clusters. Barnacles, and a thick growth of algae, covered the oysters.
- 1996 No collection.
- 1997 The site was sampled as in 1995. Oysters were found singly (5-10 cm) or in clumps with algae attached.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were obtained by grab in about 2 m of water about 200 m north of the oyster site. The sandy/silty mud was of dark color and had no odor. Clay was also present.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - WATSON BAYOU, ST. ANDREW BAY, FL

**SITE CODE** - SAWB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 08.55' N

85° 37.93' W

**LOCATED ON NOAA CHART** - 11390

**SITE ACCESS** - The station is located in Watson Bayou, which is located east of the Bay City Marina in Panama City. The site is accessed by boat launched at the Municipal Boat Ramp. Proceed east down the ICWW to the green channel marker "25", then go north into Watson Bayou. The site is located on the first promontory on the right (east side) after entering the Bayou, next to an old boat repair ramp.

**SITE DESCRIPTION** - The oysters were attached to rocks and debris along the shoreline of the promontory, next to a former shipyard just west of the old barge dock on the paper mill channel. Station 1 oysters were collected 50 m north-northwest of the old ramp, station 2 oysters were collected just to the west-southwest of the ramp, while station 3 oysters were collected 50 m to the west-southwest of the ramp.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were fairly abundant across the entire site, occurring in singles and clusters. No spat were observed amongst the barnacles growing on the oysters.
- 1996 No collection.
- 1997 Mainly small (2-8 cm) oysters were found along the concrete bulkheads.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were an odorless dark sandy silt collected from the middle of the bayou in about 4 m of water.

#### **SAMPLING METHODS**

- Oysters - hand  
Sediments -stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - MUNICIPAL PIER, PANAMA CITY, FL

**SITE CODE** - PCMP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 09.07' N

85° 39.78' W

**LOCATED ON NOAA CHART** - 11390

**SITE ACCESS** - This station is located at the Bay City Marina in Panama City. A boat is necessary to collect this site, which can be launched at the public boat ramp right next to the marina. Proceed down West Beach Blvd. and turn right onto Harrison, before the bridge over the bayou. Turn left after the F4 Phantom display, and proceed to the corner of the carpark where the public boat ramp is located.

**SITE DESCRIPTION** - All three stations are located along the bulkhead walls of the marina, close to the entrance way. Station 1 was located inside the breakwater on the east side of the marina, station 2 was located opposite Station 1 on the outside of the breakwater, and station 3 was located north of station 2 and outside the breakwater directly east of the parking lot, which is to the north of the boat ramp. The oysters were all collected from the concrete walls.

#### **OYSTER COLLECTIONS**

- 1995 Small oysters were fairly abundant in singles and clusters, all with a heavy growth of barnacles covering them.
- 1996 No collection.
- 1997 The oysters were small (2-6 cm) but numerous, attached to the concrete bulkheads of the pier.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were sand and dark color with detrital content, taken from within the marina.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m





**SITE** - JOE'S BAYOU, CHOCTAWHATCHEE BAY, FL

**SITE CODE** - CBJB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 24.65' N

86° 29.45' W

**LOCATED ON NOAA CHART** - 11385

**SITE ACCESS** - This walk-up site is reached by driving north up Beach Drive from Hwy. 98 in Destin. The site is located just south of the boat ramp at the end of Beach Drive.

**SITE DESCRIPTION** - The site is located on the south shore of Choctawhatchee Bay, at the mouth of Joe's Bayou. Station 1 is 30 m from the western shoreline, between the wooden boathouse and the two boat pier to the north. One bearing to use to locate the station is 120°, toward the Destin water tower. Station 2 is in the northeast arm of upper Joe's Bayou, near the end on the north shore between the last and next to last boathouses. Station 3 is across the bayou (east) from Station 2, between the last boat house and boat house #016. Suitable sediments for sampling are located in the southern arm of the upper part of Joe's Bayou, in about 1.5 m of water.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of medium sized oysters, that occurred in clumps along the shoreline.

1997 No collection. Stations were collected as in previous years.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sand sediment sample was collected just offshore from the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - BEN'S LAKE, CHOCTAWHATCHEE BAY, FL

**SITE CODE** - CBBL

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 27.19' N

86° 32.46' W

**LOCATED ON NOAA CHART** - 11385

**SITE ACCESS** - The site is reached by boat with access from the boat ramp located on Bayshore Drive on the east side of Boggy Bayou. Travel from Fort Walton to Niceville on Hwy. 85, cross Boggy Bayou bridge, turn right on Bayshore Drive, and continue to the public ramp on the right. By boat, go south down Boggy Bayou to Choctawhatchee Bay, then west to the entrance to Bens Lake. Travel time is approximately 30 min in good weather.

**SITE DESCRIPTION** - This site is located at the entrance to Bens Lake, which is on the north side of Choctawhatchee Bay. The entire area is part of the Eglin Air Force Base. Oysters were located and collected from the concrete and brick rubble along the shoreline, at the entrance to Bens Lake. Station 1 is on the east side of the entrance into Bens Lake. Station 2 is also on the east side of the entrance into the bay, but is 30 m further to the north. Station 3 is on the west side of the entrance into the bay.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a sparse population of small to medium sized oysters along the shoreline.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The silty sand sediment sample was collected just off the shoreline at the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - POSTIL POINT, CHOCTAWHATCHEE BAY, FL

**SITE CODE** - CBPP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 28.94' N

86° 28.76' W

**LOCATED ON NOAA CHART** - 11385

**SITE ACCESS** - The site is reached by automobile, with access through Eglin Air Force Base. Enter Eglin Air Force Base on Hwy. 85. Stop at the visitor center to ask for directions to the family camping area at Postil Point. This site used to be called CBSP - Shirk Point.

**SITE DESCRIPTION** - The site was located on the west bank at the entrance into Boggy Bayou, which is on the north side of Choctawhatchee Bay. A military "Family Camping and Recreation" area is located on Boggy Point. The oysters are collected by hand from along the shoreline from the entrance into Postil Lake north towards Postil Point. Station 1 oysters are taken from the sandy bottom, jetty rocks and the bulkhead where Postil Lake enters Choctawhatchee Bay. Oyster Station 2 is located along the shoreline about 200 m north of Station 1. Here the oysters are attached to the rocks. Station 3 is on the south side of Postil Point, on the shoreline rocks.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of medium sized oysters in one small area of the bayou. The oysters were all in clumps and were found attached to the rocks and rubble along the shoreline. The stations were not differentiated, as the oysters only came from one small general area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The fine grained silty sand sediment sample was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - BOGGY BAYOU, CHOCTAWHATCHEE BAY, FL

**SITE CODE** - CBBB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 30.24' N

86° 29.64' W

**LOCATED ON NOAA CHART** - 11385

**SITE ACCESS** - The site is reached by boat, launched at the boat ramp located on Bayshore Drive on the east side of Boggy Bayou. Travel from Fort Walton to Niceville on Hwy. 85, cross the Boggy Bayou bridge, then turn right onto Bayshore Drive and continue on to the public ramp on the right. By boat, go south down Boggy Bayou to green channel marker "9", then turn southwest and proceed into Toms Bayou. Proceed west for approximately 500 m to the road bridge.

**SITE DESCRIPTION** - The oysters are located on the concrete piling of the bridge, which crosses the middle of Toms Bayou. Station 1 is on the south end of the bridge and includes the first 5 sets of bridge pilings. Station 2 includes the middle 5 sets of piers and station 3 comprises the northern 5 sets of piers.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There were only a very few very small oysters to be found at this site. The sample is a composite one, due to the lack of oysters.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark grey anaerobic sediment sample was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHOD**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - SABINE POINT, PENSACOLA BAY, FL

**SITE CODE** - PBSP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 20.99' N

87° 09.28' W

**LOCATED ON NOAA CHART** - 11378

**SITE ACCESS** - Access to the site is by boat, launched at the public ramp in Gulf Breeze. To reach the boat ramp, cross the Pensacola Bay Bridge on Hwy. 98 and go through Gulf Breeze to Shoreline Drive. Turn right and follow the road to the Shoreline Drive Park. Turn left into the park and continue on down to the boat ramp, which is located on the north side of the Santa Rosa Sound.

**SITE DESCRIPTION** - The site is located under the south side of the Hwy. 399 bridge onto Santa Rosa Island, over the ICWW. Sampling this site is easiest at low tide and in calm weather, since the oysters are attached to the concrete piers supporting the bridge. Station 1 is the first 7 sets of piers on the south side of the bridge. Station 2 is directly north of the first station and includes the next nine large concrete piers. Station 3 includes the next eight piers to the north of station 2. The site ends at the ICWW, under the middle of the bridge.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good oyster population on the bridge pilings, with all sizes being well represented. The oyster shells were all very brittle.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected from 30° 21.29' N, 87° 08.85' W. The original sediment site was located approximately 1 mi to the northeast, on the Gulf Breeze shoreline at 30° 21.03' N, 87° 09.35' W.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.5 - 1.0 m

**SITE** - INDIAN BAYOU, PENSACOLA BAY, FL

**SITE CODE** - PBIB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 31.00' N

87° 06.70' W

**LOCATED ON NOAA CHART** - 11378

**SITE ACCESS** - Access to the site is by automobile. Exit I-10 at Avalon and go north to SR 281, then turn left and go to the stop sign. Turn left again and follow the dirt road until it ends at the Archie Glover Park. Launch the boat, and follow the marked channel out to Escambia Bay and going south under the I-10 road bridge to the reef. The reef is located about 1 mi south of the bridge, on a bearing of 140° . Run time to the site is approximately 20 min.

**SITE DESCRIPTION** - The oysters are located on a narrow subtidal reef, west of the entrance to Indian Bayou. The site is marked by several pilings, one of which has an "Oyster Reef" sign, and another has a "Danger, Oyster Reef " sign." Station 1 is at the northeast end of the reef; station 2 is 100 m southwest of station 1, near the poles marking the reef; and station 3 is another 100 m southwest of station 2, near the "Danger, Oyster Reef" sign. The best source of sediments for sampling is in Indian Bayou. Station 1 sediments are collected from the narrow Indian Bayou opening to the bay, station 2 is along the north shore of the bayou some 300 m upstream from the mouth and 30 m from shore, and station 3 is a further 100 m northeast and upstream from station 2.

#### **OYSTER COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel tongs, hand  
Sediment - N/A

**WATER DEPTH** - subtidal, 2.0 m

**SITE** - PUBLIC HARBOR, PENSACOLA BAY, FL

**SITE CODE** - PBPH

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 24.82' N

87° 11.48' W

**LOCATED ON NOAA CHART** - 11378

**SITE ACCESS** - Access to the site is by boat, launched at the public ramp at the north end of the Hwy. 98 Bridge over Pensacola Bay. The boat ramp is next to the Florida Marine Patrol station.

**SITE DESCRIPTION** - The site is located on the Pensacola Fishing Pier, which was the old Hwy. 98 Bridge. The pier is on the east side of the new bridge. Collections from this site are easiest at low tide and in calm weather, since the boat has to be tied to the concrete piers, whilst removing the samples. Station 1 is at the seventh set of pilings from the north shore, station 2 is at the eleventh set of pilings and station 3 is at the fifteenth set of pilings. Sediment samples are collected at a separate station (30° 24.14' N, 87° 11.38' W). The three samples are collected 50 m apart in a line parallel to the bridge, starting at the 45 mph sign and running towards the north. A sediment grab is needed to collect the samples as the water depth is over 6 m.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a fairly good population of small to medium sized oysters on the bridge pilings, with a few large specimens as well. All the oyster shell were very brittle, and broke easily when being removed from the pilings.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 - 1.0 m

## ALABAMA SITES

**SITE** - DOG RIVER, MOBILE BAY, AL

**SITE CODE** - MBDR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 35.50' N

88° 02.39' W

**LOCATED ON NOAA CHART** - 11376

**SITE ACCESS** - The boat launch ramp is at Dog River, which is south of I-10 on the Dauphin Island Parkway. Launch the boat at the Beach Comber ramp, and proceed out the Dog River channel to the Mobile Ship Channel, then go north to green channel marker "69". Turn into the short channel west of marker "69" and proceed to green channel marker "5". The site is located approximately 75 m away on a bearing of 280° from channel marker "5".

**SITE DESCRIPTION** - This collection site is in the upper reaches of Mobile Bay, and is near the upper distributional limit of oysters within the bay. The site is located on a reef which runs west-southwest from green channel marker "5", for approximately 300 m. Poling is required to locate the oysters on the reef. Station 1 is on the southwest end of the reef, Station 2 is approximately 100 m to the northeast and Station 3 is another 100 m northeast of Station 2.

### OYSTER COLLECTIONS

1995 No collection.

1996 Medium to large oysters were abundant across the whole area.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The dark brown silty sediment sample contained some shell hash and mussels.

1997 No collection.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 1.0 m



**SITE** - CEDAR POINT REEF, MOBILE BAY, AL

**SITE CODE** - MBCP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 18.93' N

88° 08.03' W

**LOCATED ON NOAA CHART** - 11378

**SITE ACCESS** - There is a boat ramp at the small bridge just north of the Dauphin Island causeway bridge. The site is located directly east of the middle part of Cedar Point, and is about 10 to 15 min by boat from the ramp. At low tide, the site can be reached by walking across the shallow sandbar at the north end of the reef. There is an alternate boat ramp at Cedar Point, which is only a few minutes away from the site approximately 200 m to the east.

**SITE DESCRIPTION** - The site is located on an oyster reef 200 m offshore, and east from the highway leading to the causeway bridge onto Dauphin Island. The reef is almost due east of the Cedar Point fishing pier, which is on the west side of the highway. Station 1 is at the south end of the reef, Station 3 is at the north end and Station 2 is in the middle. The total distance from Station 1 to Station 3 is no more than 150 m.

#### **OYSTER COLLECTIONS**

1995 The site was not scheduled to be sampled this year.

1996 The exposed portion of the reef mainly contained dead shell, however, there was a good population of medium to large oysters just off the reef in deeper water.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The fine grained dark sandy sediment sample was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge, hand

Sediment - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - subtidal, 1.0 - 1.5 m

## MISSISSIPPI SITES

**SITE** - PASCAGOULA BAY, MISSISSIPPI SOUND, MS

**SITE CODE** - MSPB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 20.16' N

88° 35.35' W

**LOCATED ON NOAA CHART** - 11375

**SITE ACCESS** - To reach the boat ramp on the Pascagoula River, turn off Hwy. 90 onto Market St. and head south. When the road dead-ends at the beach, turn right and drive west to the end of the road. The boat is launched at the public ramp in the channel leading into Lake Yazoo. Then, by boat, proceed west to the northwest corner of Singing River Island. Run time to the site is less than 10 min.

**SITE DESCRIPTION** - The site is located just west of the south end of the new causeway going to the Naval Base on Singing River Island, near the mouth of the West Pascagoula River. Oysters are generally abundant, and were found by poling on the subtidal reef. Station 1 is 100 m offshore next to the causeway, station 2 is 50 m further south and station 3 is another 50 m to the south.

### OYSTER COLLECTIONS

1995 The site was not scheduled to be sampled this year.

1996 There was a very good population of medium to large oysters across the entire area of the site.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The light brown sandy sediment sample contained a small quantity of silt.

1997 No collection.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 1.0 m

**SITE** - BILOXI BAY, MISSISSIPPI SOUND, MS

**SITE CODE** - MSBB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 23.55' N

88° 51.45' W

**LOCATED ON NOAA CHART** - 11372

**SITE ACCESS** - This is a walk up site accessed via automobile. Parking is at the Gulf Coast Research Lab Marine Education Center off Hwy. 90 at the Biloxi-Ocean Springs bridge.

**SITE DESCRIPTION** - The sample area is located along the shoreline in intertidal waters, where the oysters were collected from the concrete bulkhead, rocks and debris. Station 1 oysters were collected from the bulkhead and first set of pilings at the west end of the bridge, station 2 was located on the seawall between the 4th and 5th set of pilings, and station 3 was located between the 8th and 9th set of pilings from the western end of the bridge. All three stations are about 50 m apart.

#### **OYSTER COLLECTIONS**

1995 Small to medium sized oysters were abundant on the brick and concrete rubble forming the seawall. The oysters were in singles and clusters and the shells were very fragile.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - PASS CHRISTIAN, MISSISSIPPI SOUND, MS

**SITE CODE** - MSPC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 18.14' N

89° 19.63' W

**LOCATED ON NOAA CHART** - 11372

**SITE ACCESS** - This site is accessible via automobile, taking the first exit on the west side of the Hwy. 90 bridge between Bay St. Louis and Pass Christian. Follow the road south along the shoreline to Veterans Pier. A boat ramp is located on the south side of the jetty/pier, which is necessary for the sediment sampling.

**SITE DESCRIPTION** - At the pier, oysters are found attached to the rocks and rubble, and along the muddy sand bottom. The oysters are intertidal, and accessibility is easiest at low tide. Station 1 is on the north side of the jetty, station 2 is on the seaward side of the "T" end of the jetty and station 3 is on the south side of the jetty. An alternate site lies some 1.65 nm to the northeast (bearing 57°). Here the oysters are located on a submerged reef, which parallels the Hwy. 90 bridge. The reef is 10 m south of the bridge, on the east side of the channel in 2.5 m of water. GPS coordinates for this reef are 30° 18.87'N and 89° 18.05'W.

#### **OYSTER COLLECTIONS**

1995 The site was not scheduled to be sampled this year.

1996 There was a good population of medium sized oysters to be found growing on the rocks and rubble of the jetty. The shells were all very fragile.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 A fine-grained silty sand sediment sample was collected using a grab, from the end of the "T" shaped fishing pier that extends some 50 m out into the bay.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.2 m

## LOUISIANA SITES

**SITE** - NEW ORLEANS, LAKE PONTCHARTRAIN, LA

**SITE CODE** - LPNO

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 02.18' N

90° 02.48' W

**LOCATED ON NOAA CHART** - 11369

**SITE ACCESS** - Access to the site is via boat, launched at the public ramp located under the Shoreline Drive bridge over the Inner Harbor Channel. The site is located just to the north of the ramp, on the southern edge of Lake Pontchartrain. Travel time to the site is less than 5 min. This site cannot be sampled when there is a strong north wind due to the high waves that develop.

**SITE DESCRIPTION** - This site was originally designated LPGO, Lake Pontchartrain, Gulf Outlet. The name was changed in 1995, as the site is actually located just off the New Orleans shoreline on the south side of Lake Pontchartrain. The site is located approximately 1 km northwest of the bridge, and to the west of the New Orleans Lakefront Airport. Oysters occur at this site, due to a deep salt water wedge that enters through the Inner Harbor Channel, from the Mississippi River. The high salinity water allows the oysters to exist in the deeper water on the bottom of Lake Pontchartrain, near the outlet. Station 1 is located some 400 m north of the U.S. Naval-Marine Corps Reserve Station, station 2 is 100 m north of the two tall light poles on the shore and station 3 is 100 m northeast of Station 2, and about 200 m offshore.

### OYSTER COLLECTIONS

- 1995 The oyster stations were located along the edge of the channel in deep water. Small to medium sized oysters were very sparse as the Louisiana Fish and Wildlife Department have removed most of them in a replanting project. Separate samples for each station were not collected due to the sparse oyster population. Two hours of dredging was required to obtain sufficient oysters for the analytical work.
- 1996 The oyster population was very poor this year, with only a few small and medium sized oysters being found after an extensive search.
- 1997 No collection.

### SEDIMENT COLLECTIONS

- 1995 No collection.
- 1996 The soft light brown silty sand sediment sample was collected in 7.5 m of water, near the nominal site center.
- 1997 No collection.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab, stainless steel scoop

**WATER DEPTH** - Subtidal, 4.0 m

**SITE** - GULF OUTLET, LAKE BORGNE, LA

**SITE CODE** - LBGO

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 56.69' N

89° 50.12' W

**LOCATED ON NOAA CHART** - 11371

**SITE ACCESS** - Access is by boat launched at the marina north of Chalmette, off LA Hwy. 47. From the marina, travel north to Bayou Bienvenue, then east to the first channel or continue on to the Mississippi River Gulf Outlet Canal. Turn right (southeast) and continue on for 5 mi, then turn left into Lake Borgne at the red channel marker "116". An alternate boat ramp/lift is at Shell Beach, off of LA Hwy. 39. At Shell Beach, launch the boat in Bayou Yscloskey, proceed northeast to the Mississippi River Gulf Outlet, and then northwest up the Outlet to the red channel marker "116".

**SITE DESCRIPTION** - This site was originally designated LBNO, Lake Borgne New Orleans. The name was changed in 1995, as the site is located just off the Gulf Outlet and not in New Orleans. The site is located just inside the pass into the lake, along the south shore, to the south of the Martello Castle. Station 1 is located 200 m southeast of the Castle and 50 m northwest of two poles with the signs "DANGER - OYSTER REEFS". Station 2 is 50 m south-southeast from station 1 and offshore from the poles, while station 3 is a further 50 m to the south-southeast. All three stations were sampled some 25 m out from the shoreline.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were found across the entire area, occurring in singles and clusters. All of the oysters had a heavy growth of mussels on their shells.
- 1996 The small to medium sized oysters were widely scattered in a few singles and clumps.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection. The sediments in the area are a light brown silty sand.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment- N/A

**WATER DEPTH** - intertidal, 0.0 - 0.5 m

**SITE** - MALHEUREUX POINT, LAKE BORGNE, LA

**SITE CODE** - LBMP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 52.02' N

89° 40.71' W

**LOCATED ON NOAA CHART** - 11364

**SITE ACCESS** - Access to the site is via LA Hwy. 39 to Shell Beach. At Shell Beach, launch the boat in Bayou Yscloskey, proceed northeast across the Mississippi River Gulf Outlet and into Lake Borgne. Proceed around to the west side of Old Fort Beauregard, where the sampling site is located. Run time to the site is less than 15 min. Malheureux Point is actually some 16 mi to the northeast of the site center.

**SITE DESCRIPTION** - Oysters were collected from the bricks and rubble around the old fort in intertidal waters. The nominal site center is in a small cove to the southwest of the old fort. Station 1 is located to the southwest of the fort, at the east end of the rubble breakwater, station 2 is 50 m to the east and is situated on the mudflats, and station 3 lies a further 50 m to the southeast in the small cove.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes are scattered across the entire site, in more than adequate numbers for the sampling protocol. There was a particularly heavy growth of mussels, and mussel spat, over the whole area.
- 1996 The small to medium sized oysters were generally in a poor condition, all with very soft fragile shells. There was a great quantity of shell debris.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The dark brown silty sediment sample was mixed with some clay.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.2 m

**SITE** - BAY GARDENE, BRETON SOUND, LA

**SITE CODE** - BSBG

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 35.88' N

89° 37.25' W

**LOCATED ON NOAA CHART** - 11364

**SITE ACCESS** - The site is accessed by boat launched from Beshel's Lift. From East Pointe a la Hache go south 7.5 mi on LA Hwy. 39. Turn right at the large Chevron sign to get to the marina. By boat, proceed southeast down the Back Levee Canal to the Lower Grand Bayou, then northeast along the bayou to Battle Ground Bay. In Battle Ground Bay go north-northwest into Island Bay, then northeast through Fell Cut. Proceed east-northeast across Grand Point Bay and go through Bayou Boue. Bayou Lost is due east of here and just to the north of Pintail Point, directly across Bay Gardene. The site is located along the south shore of the western end of Bayou Lost, to the west of the LA Fish and Wildlife Camp. Approximate run time to the site is 0.75 hrs.

**SITE DESCRIPTION** - This site is located on a small unnamed island between Bayou Lost and Lonesome Island on the eastern side of Bay Gardene. Station 1 is located at the western end of the Fish and Wildlife Camp island, on the south side of Bayou Lost. Station 2 is located 100 m to the east on the middle of the island on the south side of the bayou and station 3 lies a further 100 m to the east of Station 2.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were abundant throughout the entire area, which is privately leased. The oysters occurred in singles and clusters on the soft mudflats, along the edge of the *Spartina alterniflora* marsh.
- 1996 The oyster population was very sparse this year, though the existing oysters were all large in size. The site was moved some 30 m closer to the old Fish and Wildlife Camp, at the cut through the marshland. The sample is a composite one, due to the few available oysters.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The dark silty sediment sample was collected from the channel alongside the oyster site.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - SABLE ISLAND, BRETON SOUND, LA

**SITE CODE** - BSSI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 24.34' N

89° 29.03' W

**LOCATED ON NOAA CHART** - 11364

**SITE ACCESS** - The site is accessed from the Buras Riverside Marina, on the west bank of the Mississippi River, off of LA Hwy. 23. Cross the Mississippi River, go through the Ostrica Locks and down the Ostrica Canal into Quarantine Bay. Follow the marked channel to the entrance to Bayou Bio, then go east to Sable Island. The boat run time is less than 30 min, allowing for the Ostrica Locks.

**SITE DESCRIPTION** - The site is located on the southwest side of Sable Island. Oyster reefs were ubiquitous to the area around the island and there are some good oyster beds here. There is one particularly good reef, clearly marked with white PVC poles, on the southwest side of the island (29° 24.26' N, 89° 29.09' W). All three stations were collected along this reef, within the marker poles.

#### **OYSTER COLLECTIONS**

1995 The site was not scheduled to be collected this year.

1996 The oyster population was very poor this year. The small to medium sized oysters were widely scattered and few in number, resulting in a composite sample.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sediment sample contained some shell hash.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 1.5 - 2.0 m

**SITE** - PASS A LOUTRE, MISSISSIPPI RIVER, LA

**SITE CODE** - MRPL

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 05.37' N

89° 04.49' W

**LOCATED ON NOAA CHART** - 11361

**SITE ACCESS** - Access to the site is via boat, launched from the Venice Marina. From the boat basin, head upstream to the main fork of the Mississippi River at The Jump, then proceed downstream to the Head of Passes. Take the east fork holding to the south shore to avoid the large sandbar at the entrance to Pass a Loutre. Proceed east to the second cut to the south, and go down Southeast Pass to the first oil tanks (29° 07.75' N, 89° 05.78' W), and then south into Redfish Bay via a narrow reed-lined channel. No attempt should be made to travel to this site except in calm weather. An alternate route is to continue on down Southeast Pass to the mouth, then come back (northwest) into Redfish Bay.

**SITE DESCRIPTION** - The site is located at the extreme southeast edge of Redfish Bay, just to the north of the last small island. Prominent landmarks are the Port Eads Lighthouse (240°) at South Pass, and the green tanks on the Exxon platform (350°). The oysters are dredged 5 to 10 m out from the reed lined shore in 1 m of water. A composite sample was collected due to the small size of the reef.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of oysters in large clumps in one small area. The sample is a composite.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark brown silty sediment sample was collected just off the shoreline from the oyster reef.

1997 No collection.

#### **SAMPLING METHODS**

Oyster - stainless steel dredge

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 1.0 - 2.0 m

**SITE** - TIGER PASS, MISSISSIPPI RIVER, LA

**SITE CODE** - MRTP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 08.70' N

89° 25.64' W

**LOCATED ON NOAA CHART** - 11361

**SITE ACCESS** - Access to the site is by boat, launched at the Venice Marina. Proceed down Tiger Pass to the entrance, approximately 0.5 to 1 hr depending on the weather conditions. The mouth of Tiger Pass is bordered by a jetty on both sides; proceed past the end of the northwest jetty to green channel marker "7", and then turn back around the jetty and head north to the shoreline. The site is directly north of the jetty and green channel marker "9".

**SITE DESCRIPTION** - This site is located on the west side of the Mississippi River delta near the mouth of Tiger Pass. The site is on the southwest shoreline of a small smooth cordgrass island, near a telephone pole at the edge of the marsh. Individual stations are contiguous along the shoreline. Station 1 is on the shoreline, just north of where the Tenneco pipeline canal runs into the bay on the east and southeast from the telephone pole at station 2. Station 2 is the next along some 100 m of the shoreline to the north across from the telephone pole with two bolts. The pole is approximately 20 m from the shoreline. Station 3 is northwest from the pole and up to where the canal forms the northwest boundary of the marsh island.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There were only a few small oysters and spat to be found in the area. The sample is a composite one.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark gray clay sediment sample contained some silt, and was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge, hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - MIDDLE BANK, BARATARIA BAY, LA

**SITE CODE** - BBMB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 16.60' N

89° 56.52' W

**LOCATED ON NOAA CHART** - 11365

**SITE ACCESS** - The site is accessed by boat launched at Cheramines Marina, in Grand Isle. From the marina, proceed east across Barataria Pass, to the Louisiana Fish and Wildlife Camp on the northwestern tip of the western Grand Terre Islands. Run time is less than 10 min. An alternate launching ramp is at the Grand Isle Coast Guard Station, at the end of LA Hwy. 1.

**SITE DESCRIPTION** - This site is located in a *Spartina alterniflora* marsh, along the eastern side of the channel going into the Grand Terre Fish and Wildlife station. Station 1 is located 5 m north from the end of the wooden bulkhead, to the north of the Fish and Wildlife station. Station 2 lies 50 m north of the wooden bulkhead, next to an aluminum pole. Station 3 lies 100 m north of the bulkhead, next to the wooden post and "Keep Out" sign. All three stations lie on the eastern side of the channel.

#### **OYSTER COLLECTIONS**

- 1995 Medium to large mussels were abundant throughout the area, occurring in singles and clusters.
- 1996 No collection.
- 1997 The same stations were sampled as in previous years. Oysters were abundant and found in clumps with individual sizes of 3-9 cm.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were silty mud co-located with the oysters.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - BAYOU ST. DENIS, BARATARIA BAY, LA

**SITE CODE** - BBSD

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 24.29' N

89° 59.93' W

**LOCATED ON NOAA CHART** - 11365

**SITE ACCESS** - The site is accessed by boat launched at Cheramines Marina, or the U.S. Coast Guard Station in Grand Isle. From Grand Isle, proceed north up the Barataria Waterway to green channel marker "31". Then proceed northwest into Bayou Cholas, to green channel marker "9". The eye of hurricane "Andrew" passed over Grand Isle in August 26, 1992. As a result, some of the outlines of the islands and landforms have changed since the chart was issued, and sometimes provide little reference for determining position. Run time to the site is approximately 45 min.

**SITE DESCRIPTION** - This site is located in Bayou Cholas, on the west side of the Barataria Bay and of the Barataria Waterway. Station 1 is located 300 m west of the green channel marker "9", and 100 m to the south of a thick wooden post. Station 2 is 200 m west of the channel marker and inside the marked oyster reef area (marked with white PVC and wooden poles). Station 3 is also inside the reef area, some 100 m west-southwest from the green channel marker.

#### **OYSTER COLLECTIONS**

- 1995 This is a very productive reef, with medium to large oysters occurring in singles and clusters across the entire reef. One 5 min dredge tow will more than adequately fill the sample quota per station.
- 1996 No collection.
- 1997 The oysters were numerous but not abundant. Several drags were needed to get sufficient quantities in the 2-12 cm size range.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were odorless silty mud with shell hash. Collecting sites were co-located with the oyster site.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge  
Sediments - N/A

**WATER DEPTH** - subtidal, 0 - 3.0 m

**SITE** - TURTLE BAY, BARATARIA BAY, LA

**SITE CODE** - BBTB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 30.67' N

90° 05.00' W

**LOCATED ON NOAA CHART** - 11365

**SITE ACCESS** - Access to this collection site is by boat launched at the C & M Marina in Lafitte, at the end of LA Hwy. 45. By boat, proceed south down the Barataria Waterway through Bayou Cutler to the red channel marker "50". Go west into Bayou St. Denis, then northwest into Turtle Bay.

**SITE DESCRIPTION** - The site was originally located on the south side of the entrance into Bayou St. Denis from Little Lake, next to a row of red and white poles that paralleled the shoreline to the south. Landmarks to locate the site are 110° to a small treed island and 30° to a green camp house and silver storage tank. Oysters are not abundant here, therefore distinct stations were not established.

#### **OYSTER COLLECTIONS**

1995 No collection because no live oysters were found in the Turtle Bay area.

1996 No collection.

1997 No collection because no live oysters were found in the Turtle Bay area.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - N/A

**WATER DEPTH** - subtidal, 2.0 - 3.0 m

**SITE** - LAKE FELICITY, TERREBONNE BAY, LA

**SITE CODE** - TBLF

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 15.85' N

90° 23.89' W

**LOCATED ON NOAA CHART** - 11357

**SITE ACCESS** - The launch ramp is located at the Coco Marina, in Cocodrie. An alternate ramp is located at the LUMCON facility, also in Cocodrie. From the marina, proceed south down Bayou Petit Caillou to the Houma Navigation Canal, then southwest out into Terrebonne Bay. At green channel marker "17", head east to Pass Barre, then northeast across Lake Barre and into Lake Felicity. The run time to the site is about 1 hr by boat. A second alternate ramp is on the Robinson Canal - the Lapeyrouse launch ramp. From here, follow the Robinson Canal down to Bayou Petit Caillou and on to the Lapeyrouse Canal. Then proceed to Bayou Terrebonne and head south to green channel marker "7" at the entrance into Lake Barre. A course of 70° will take one across Lake Barre and into Lake Felicity. The site is located at an old, abandoned, burned out fishing camp on the southeast side of Lake Felicity, near Grand Pass Felicity. If this site is being sampled along with TBLB (Terrebonne Bay, Lake Barre), one can easily go across Lake Barre to the Lake Felicity. Landforms in the area sometimes bear little resemblance to the local navigation charts as a result of a few hurricanes and lack of recent surveys.

**SITE DESCRIPTION** - Station 1 is located on the grass flats at the southeast corner of the bay, south of green channel marker "5" in Felicity Bayou next to the abandoned fishing camp. Station 2 is located approximately 200 m northwest of the dock at the fishing camp, at a bearing of 320° from Station 1. The oysters are collected from a small reef at the edge of the *Spartina alterniflora* marsh. Station 3 is a subtidal grass bed west of the fishing camp, on an island at a bearing of 240° from the camp.

#### **OYSTER COLLECTIONS**

- 1995 The site was not scheduled to be collected this year.
- 1996 There was a good population of oysters across the entire area of the site, mainly growing in large clumps interspersed with a few singles.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The dark gray clay sediment sample contained some silts, and was collected just off the nominal site center.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 to 0.5 m

**SITE** - LAKE BARRE, TERREBONNE BAY, LA

**SITE CODE** - TBLB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 15.57' N

90° 35.66' W

**LOCATED ON NOAA CHART** - 11357

**SITE ACCESS** - Access to the site is by boat launched at the Coco Marina, in Cocodrie. Alternate launch ramps are at the LUMCON facility, also in Cocodrie, or at the Lapeyrouse Ramp on the Robinson Canal. Proceed north along Bayou Petit Caillou to the second cut to the east. Turn right (east) into the Lapeyrouse Canal and proceed to Bayou Terrebonne. Then turn south and proceed to the third cut to the left (east) on Bayou Terrebonne, that will lead into Bay la Fleur. The site lies along the edge of the Bayou Terrebonne to south of this cut. The run time to the site is approximately half an hour.

**SITE DESCRIPTION** - All three stations are located along Bayou Terrebonne. Station 1 is in a small bay on the west side of the bayou, about 0.5 mi north of the cut into Lake Barre. Landmarks and bearing are 265° to the LUMCON tower, 163° to green channel marker "3", and 106° to the Montegert water tower. Station 2 is located further upstream at the mouth of Bayou Lucien, near an old fishing camp on Bayou Terrebonne. Compass bearings are 258° to the LUMCON tower, and 116° to the green channel marker "1". Oysters and sediments are collected near the remains of a galvanized corrugated iron shed and wooden dock, in the intertidal waters on the northwest shore. Station 3 is farther north on Bayou Terrebonne at the Lake Barre Pass cut to the east, which is the first cut to the east, north of Seabreeze Pass. This cut connects to Bay la Fleur, which lies to the east of Terrebonne Bayou, northwest of Lake Barre. The samples were collected from an intertidal reef on the southwest shore.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of oysters at the site, growing in large clumps interspersed with a few singles.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The silty sediment sample contained some dark gray clay. The sample was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.2 m

**SITE** - CAILLOU LAKE, CAILLOU LAKE, LA

**SITE CODE** - CLCL

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 15.19' N

90° 55.60' W

**LOCATED ON NOAA CHART** - 11356

**SITE ACCESS** - The boat launch is at Bayou DuLarge Sporting Goods, at the end of LA Hwy. 315. Proceed down Bayou du Large to the southwest, to the channel connecting Lake Caillou and Lake Merchant. Turn south into Caillou Lake and head towards the Fish and Wildlife Camp on the island to the southeast. Run time to the site is about half an hour.

**SITE DESCRIPTION** - The site is located in Caillou Lake, between red channel marker "14" and the Fish and Wildlife Camp. The reef is usually closed to oystering as it is in a research area. It is necessary to notify the Fish and Wildlife Camp officials prior to sampling.

#### **OYSTER COLLECTIONS**

- 1995 Medium to large oysters are found in singles and clusters, scattered in patches throughout the area. There are no well defined oyster reef.
- 1996 No collection.
- 1997 Abundant oysters in the size range 3-9 cm were collected by dredge at the GPS location (station 1), 100 m SE of station 1 (station 2), and 100 m further SE (station 3). Abundance was numerous.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection. The sediment sampling stations are located to the north of the oyster site, along the shoreline that separates Bayou du Large from Caillou Lake. Sediment Station 1 is located at the base of red channel marker "18". Station 2 is located at the mouth of a small cove 300 m to the east. Station 3 is located about 100 m from the shore in the large cove due north of the Fish and Wildlife Camp.
- 1996 No collection.
- 1997 The odorless dark silty muds were co-located with the oyster collection sites.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 2.0 m

**SITE** - OYSTER BAYOU, ATCHAFALAYA BAY, LA

**SITE CODE** - ABOB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 15.33' N

91° 08.17' W

**LOCATED ON NOAA CHART** - 11356

**SITE ACCESS** - The only access to the site is by boat, via a circuitous route of over 20 mi that will take a minimum of an hour in good weather. The only launch ramp is at DuLarge Sporting Goods, at the end of LA Hwy. 315. Proceed southwest down Bayou du Large to the channel that joins Lake Mechant and Caillou Lake. From here, there are a number of different ways to get to Oyster Bayou. One route is to cross Caillou Lake and go down Grand Bayou du Large and out into the Gulf. From here, head west some 10 mi to the large navigation marker (29° 12.73' N, 91° 07.70' W) just to the south of the mouth of Oyster Bayou into the open Gulf, and then west along the beach front to Oyster Bayou. A more circuitous route is possible through Lake Merchant, then winding through the Blue Hammock Bayou and into Four Leagues Bay. From here, head south to Oyster Bayou. However, the western end of Lake Mechant and the eastern section of the Blue Hammock Bayou are very shallow, and should not be attempted except in a shallow draft boat at medium to high tide.

**SITE DESCRIPTION** - The sampling stations are all intertidal and are located along the length of Oyster Bayou, which joins Four League Bay with the Gulf of Mexico to the south. The *entire* area is private lease. Station 1 is located 300 m south of the old shrimp drying camp (on the east bank) on a small reef on the west side of the bayou. Station 2 is located right next to the old shrimp drying camp on the east bank, and Station 3 is another 250 m to the north on the west bank.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were abundant throughout the entire area, occurring in singles and clusters on the reefs and mudflats along the edge of the bayou and *Spartina alterniflora* marshland. The entire area had been closed to oystering by the LA Department of Health.
- 1996 No collection.
- 1997 As usual in this most prolific commercial lease, oysters were very abundant and of good size (4-8 cm).

#### **SEDIMENT COLLECTIONS**

- 1995 No sediments were collected this year. Sediment Station 1 is located in a small cove on the west bank, at the mouth of Oyster Bayou. Station 2 is located on the east side shoreline, 0.5 mi north of Station 1 and 300 m south of the old shrimp drying camp. Station 3 is located north of station 2 on the east shore, at the southernmost pilings of the old dock next to the three abandoned old wooden buildings with rusty tin roofs.
- 1996 No collection.
- 1997 The sediments were collected by hand using the scoop. Sediments were brown to dark grey silty mud without odor.

#### **SAMPLING METHODS**

Oyster - hand

Sediment - hand held stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 2.0 m

**SITE** - SOUTH POINT, EAST COTE BLANCHE, LA

**SITE CODE** - ECSP

**TARGET MATRIX** - Sediments

**NOMINAL SITE CENTER** - 29° 28.5' N

91° 48.00' W

**LOCATED ON NOAA CHART** - 11351

**SITE DESCRIPTION** - A dead oyster reef is found at the mouth of Oyster Bayou (through Marsh Island), and spartina beds are located at the shoreline. No oysters were found in 1986 and only sediments were sampled. This site is located on the southeast side of Marsh Island. Sediments can be found at the mouth of Oyster Bayou.

#### **SEDIMENT COLLECTIONS**

1995 No Collection.

1996 No Collection.

1997 No Collection.

#### **SAMPLING METHODS**

Sediment - Box core and stainless steel scoop

**WATER DEPTH** - 1.5 m

**SITE** - SOUTHWEST PASS, VERMILION BAY, LA

**SITE CODE** - VBSP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 34.77' N

92° 03.06' W

**LOCATED ON NOAA CHART** - 11349

**SITE ACCESS** - Access to the site is by boat, launched into the Quintana Canal at the Cypremort Point State Park. From LA Hwy. 90, head south along Hwy. 83 to Louisa, then follow Hwy. 319 south to the State Park. Southwest Pass is about 10 mi across Vermilion Bay from the boat ramp, at a bearing of 225°. Green channel marker "1" (29° 37.62' N, 91° 51.62' W) lies just to the north of the Pass. The site lies to the west of green channel marker "3" (29° 34.89' N, 92° 03.14' W), which is just south of the Pass entrance. Shoaling is very steep and treacherous through Southwest Pass, especially on the west side of the channel opposite Marsh Island.

**SITE DESCRIPTION** - The site is located adjacent to the channel, to the west of Lighthouse Point in Lease Block 25918. Station 1 is located 50 to 100 m west of the green channel marker "3", just to the east of a north/south line of white PVC poles. Station 2 is located just to the west of the PVC poles, some 150 to 200 m from the channel marker. Station 3 lies some 400 m west of the marker, close to a second north/south line of white PVC poles.

#### **OYSTER COLLECTIONS**

- 1995 There were very few small to medium sized oysters to be found across the entire area. There was a great deal of shell, with a few spat and some mussels.
- 1996 No collection.
- 1997 Dredging at the designated sites produced only dead shell. The oysters were collected by hand from the exposed reefs (low tide) adjacent to the designated stations. Oysters were numerous and in the size range 3-7 cm.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected by hand with the scoop adjacent to the oyster collections and were brown silty/sandy muds with no odor.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge  
Sediment - stainless steel scoop

**WATER DEPTH** - subtidal, 1.5 - 2.0 m

**SITE** - JOSEPH HARBOR BAYOU, J. HARBOR BAYOU, LA **SITE CODE** - JHJH

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 38.21' N 92° 46.01' W

**LOCATED ON NOAA CHART** - 11344

**SITE ACCESS** - Access to the site is by boat, launched at a public boat ramp just off Hwy. 82, to the west of the North Island Canal swing bridge. The ramp is about 5 mi east of the Grand Chenier water tower, on the right hand side (south side) of the road behind a small Pennzoil pumping facility. The ramp is not easily sighted from the highway. Proceed by boat south along the Humble Canal, to the mouth of Joseph Harbor Bayou. Run time to the site is approximately 20 min.

**SITE DESCRIPTION** - The site is located along the edge of the bayou, next to the *Spartina alterniflora* marshland. Station 1 is located 500 m upstream from the mouth of the Bayou, on the west bank. Station 2 lies a further 100 m upstream, at a bearing of 315° from station 1. Station 3 is 50 m northwest of station 2 on a small reef on the intertidal mudflat. Low tide is the optimum collection time, as the oysters can then be picked up by hand.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were scattered across the numerous reefs, in singles and clusters. No spat were observed.
- 1996 No collection.
- 1997 The large oysters (6-15 cm) were numerous and found in aggregations.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The sediments were collected adjacent to the oyster stations. Sediments were a dark odorless mud with a light brown surficial layer.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment- N/A

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - LAKE CHARLES, CALCASIEU LAKE, LA

**SITE CODE** - CLLC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 30° 03.52' N

93° 18.45' W

**LOCATED ON NOAA CHART** - 11347

**SITE ACCESS** - Access to the site is gained by boat, launched at the Cajun Cove Marina boat ramp. From LA Hwy. 210 in Lake Charles, head south on Hwy. 384 towards Grand Lake. Cross over the ICWW and Black Bayou, and the ramp is on the right about a mile and a half down the road. From the ramp, proceed west about a mile to the shell island. The channel going out from the launch is very shallow at low tide. The Hwy. 27 bridge over the ICWW at Ellender is due west of the site, where there is another boat ramp located under the bridge.

**SITE DESCRIPTION** - This collection site is located at the north end of Calcasieu Lake, just to the east of a small island between East and West Passes. The red channel marker "88" on the Calcasieu Ship Channel is located about 0.75 mi due west of the site. Station 1 is located on the south end of the shell reef, just to the northeast of the *Spartina alterniflora* island. Station 2 is 75 m to the north and station 3 is 100 m west of Station 2. Oysters can easily be collected by hand at low tide.

#### **OYSTER COLLECTIONS**

1995 No collection.

1996 There was a good population of small to medium sized oysters on the reef, occurring mainly in clumps with a few singles.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The dark muddy sediment sample contained organics, and was collected just off the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand held stainless steel scoop

**WATER DEPTH** - intertidal, 0.1 - 0.5 m

**SITE** - ST. JOHNS ISLAND, CALCASIEU LAKE, LA

**SITE CODE** - CLSJ

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 49.74' N

93° 23.04' W

**LOCATED ON NOAA CHART** - 11347

**SITE ACCESS** - The boat is launched at the small ramp just to the north of the ferry crossing the Calcasieu Channel, to the west of Cameron. The ramp is located on the west bank of the channel, just off LA Hwy. 27/82. Proceed north up the Calcasieu Channel and then west along West Pass. Run time to the site is about 15 min.

**SITE DESCRIPTION** - The site is located in West Cove near the mouth of West Pass, between the St. Johns Island shoreline and Rabbit Island. Station 1 is located 100 m north of the West Pass mouth, in line with Rabbit Island. There are numerous white PVC pole markers marking the reef. Station 2 is 100 m east of Station 1 and about 50 m north of St. Johns Island. Station 3 is located on a small intertidal reef at the opening of the mouth of West Pass, on the east bank.

#### **OYSTER COLLECTIONS**

1995 Medium and large oysters were abundant across the entire reef, occurring in singles and clusters. No spat or small oysters were observed.

1996 There was a good population of small to medium sized oysters across the entire area of the site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sand sediment sample was collected at the nominal site center.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge, hand

Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - BLUE BUCK POINT, SABINE LAKE, LA

**SITE CODE** - SLBB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 47.45' N

93° 54.38' W

**LOCATED ON NOAA CHART** - 11342

**SITE ACCESS** - The site is accessed by boat launched at the ramp on the east side of Sabine Lake, at the LA Hwy. 82 bridge at Mesquite Point. The ramp is on the left, just after crossing into Louisiana. The site is north-northeast of the ramp at Blue Buck Point, about a 10 min run by boat.

**SITE DESCRIPTION** - The site is adjacent to Blue Buck Point, in the lower part of Sabine Lake. Station 1 is located 250 m southeast of the duck blind on Blue Buck Point, and west of the three oil storage tanks. Station 2 lies 100 m south of the duck blind on the point, and station 3 is 100 to 150 m west of the point.

#### **OYSTER COLLECTIONS**

1995 Only a few small to medium sized oysters were found in the area, occurring both in singles and clusters. There was a great deal of clean shell, suggesting a recent fresh water die-off.

1996 No collection.

1997 The oysters were collected by dredge in 2-3 m of water at stations 1 and 2. Abundance was low so that many drags were required. Thus the balance of the oysters came from a station relocated to the intertidal part of the reef (new station 3 at 29° 47.63 N, 93° 54.21' W). This new station was relocated approximately 0.3 mi to the northeast of station 2. Water depth at station 3 was 0 to 0.3 m.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 The sediments were collected by grab at stations 1 & 2 in 2 m of water. The dark grey silty mud was topped with a layer of light brown mud.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - stainless steel grab and stainless steel scoop

**WATER DEPTH** - subtidal, 1.0 - 1.5 m

## TEXAS SITES

**SITE** - HANNA REEF, GALVESTON BAY, TX

**SITE CODE** - GBHR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 28.82' N

94° 44.51' W

**LOCATED ON NOAA CHART** - 11326

**SITE ACCESS** - The boat can be launched at TAMU Mitchell Campus boat basin on Pelican Island. From there, proceed west under the Pelican Island bridge and then north-northwest to the ICWW. Follow the Waterway northeast across the Houston Ship Channel, and then along the Bolivar Peninsula. At the first cut, go north into Sievers Cove then northwest (bearing 328°, about 3 mi) across East Bay to the reef. Part of Hanna Reef is intertidal, and is therefore easily spotted. Alternate launching ramps are located at Eagle Point, at the San Leon Marina, and at the numerous marinas and fishing camps along the Bolivar Peninsula.

**SITE DESCRIPTIONS** - Hanna Reef is a large subtidal reef that runs northwest to southeast and separates East Bay from Galveston Bay. The large exposed portion in the middle of the reef serves as the point of reference for site identification. Station 1 oysters were collected 100 m north of the western end of the exposed portion of the reef. Station 2 oysters were collected 100 m north of the middle portion of the reef (100 m east of Station 1) and station 3 oysters were collected 100 m north of the eastern end of the exposed reef (100 m east of Station 2).

### OYSTER COLLECTIONS

- 1995 The oyster reef is an extremely plentiful one, with a great number of commercial vessels dredging for oysters. Oysters were abundant in all sizes, both in clusters and singles.
- 1996 No collection.
- 1997 In contrast to most previous years the population was very scarce. Most oysters were small and some were medium size. Ten to 15 dredge tows were required to get the sample.

### SEDIMENT COLLECTIONS

- 1995 The dark brown silty mud sediment samples were collected adjacent to the oyster stations.
- 1996 No collection.
- 1997 The dark brown fine silt was collected with a grab.

### SAMPLING METHODS

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - subtidal, 1.0 - 3.0 m

**SITE** - SHIP CHANNEL, GALVESTON BAY, TX

**SITE CODE** - GBSC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 42.27' N

94° 59.58' W

**LOCATED ON NOAA CHART** - 11326 and 11328

**SITE ACCESS** - Access to the site is gained by small boat, launched at the Galley Restaurant and Marina. The ramp is on the southeast side of the old bridge over the channel into Black Duck Bay (east of the tunnel under the Houston Ship Channel), on Hwy. 146. From the Marina, go southeast into Tabb's Bay. The site is located at the western end of Tabb's Bay, just southeast from the ruins of the concrete jetties and due north of the northwest corner of Hog Island. An alternate boat ramp is at the Houston Yacht Club, north of Red Bluff.

**SITE DESCRIPTION** - The three oyster stations are located on a submerged reef 100 m south of the old jetty concrete pilings.

#### **OYSTER COLLECTIONS**

1995 No live oysters were found in the area.

1996 No collection.

1997 No live oysters were found in the area.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - NA

**WATER DEPTH** - subtidal, 1.0 to 2.0 m

**SITE** - YACHT CLUB, GALVESTON BAY, TX

**SITE CODE** - GBYC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 37.32' N

94° 59.75' W

**LOCATED ON NOAA CHART** - 11326

**SITE ACCESS** - The site is accessed by boat launched at the Houston Yacht Club. Alternate boat ramps are at Eagle Point, at the San Leon Marina, or at the Galley Restaurant Marina near the Baytown bridge on Hwy. 146. The subtidal reef is located at Judges Stand (a 7-m high wooden platform with four pilings), 200 m northeast of the yacht basin entrance.

**SITE DESCRIPTION** - Station 1 is just to the southeast of Judges Stand. Station 2 is 50 m to the southeast of Station 1, and station 3 is a further 50 m to the southeast from station 2.

#### **OYSTER COLLECTIONS**

1995 The oysters were dredged from the submerged reef southeast of Judges Stand. The small to medium sized oysters were fairly abundant, with some small mussel growth on them.

1996 No collection.

1997 The oysters were abundant and in clumps. All collections were made in the vicinity of the judges stand about 100 m from the yacht club entrance.

#### **SEDIMENT COLLECTIONS**

1995 The medium brown silty sediments were collected at stations adjacent to the oyster collection stations.

1996 No collection.

1997 The sediments were collected at the oyster location by grab. Silt with a dark brown color.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - subtidal, 3.0 - 4.0 m.

**SITE** - TODD'S DUMP, GALVESTON BAY, TX

**SITE CODE** - GBTD

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 30.18' N

94° 53.76' W

**LOCATED ON NOAA CHART** - 11326

**SITE ACCESS** - Access to the site is gained via small boat launched at the San Leon Marina, at Eagle Point. The site is about a mile east-northeast of Eagle Point, on the west side of the Houston Ship Channel. Alternate launching sites are available at the Houston Yacht Club, and at the TAMU Mitchell Campus Small Boat Basin on Pelican Island.

**SITE DESCRIPTION** - This extensive reef runs from Eagle Point out to Red Fish Island to the west of the Houston Ship Channel, and is oriented west-southwest to east-northeast. The top of the reef is exposed at low tide, and there is an old wrecked shrimp boat in the middle of the reef (29° 29.70' N, 94° 53.82' W). Station 1 lies 25 m to the northeast of the wreck, station 2 is 100 m to the west of the wreck and station 3 is 100 m east of the wreck. All three stations are about 25 m off the north side of the exposed reef.

#### **OYSTER COLLECTIONS**

- 1995 The oyster population was not very good this year, however oysters of all sizes were found scattered along the reef.
- 1996 No collection.
- 1997 In comparison to previous years the population was very scarce. Oysters were small to medium size and found in clumps. Sampling was subtidal with the dredge.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediments were a light brown silty mud overlying a dark clay layer. The samples were collected some 50 m to the northwest of each of the oyster stations.
- 1996 No collection.
- 1997 The sediments were taken with a grab at the dredge sites. Sediments were brown sands.

#### **SAMPLING METHODS**

Oysters - stainless steel dredge

Sediment - stainless steel grab and Teflon coated scoop

**WATER DEPTH** - subtidal, 1.0 - 2.0 m

**SITE** - OFFATTS BAYOU, GALVESTON BAY, TX

**SITE CODE** - GBOB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 17.04' N

94° 50.18' W

**LOCATED ON NOAA CHART** - 11324

**SITE ACCESS** - This site is a walk-up for bivalve collections, at the northwest end of the 61st St. Bridge in Galveston. For sediments, the site is accessed via small boat, launched at the TAMU Mitchell Campus boat basin, on Pelican Island. From there, proceed west under the Pelican Island Bridge and then continue west into the ICWW. Proceed under the railway bridge and the U.S. Hwy. 45 Galveston bridge to the green can "27", then go south-southeast down the marked channel towards Offatts Bayou. At red channel marker "14", off Teichman Point, head east into Offatts Bayou and towards the 61st St. Bridge. Alternate boat ramps are available at the numerous fish and bait camps in Offatts Bayou.

**SITE DESCRIPTION** - This collection site is located at the northwest end of the 61st St. Bridge, over Offatts Bayou. Oysters can be collected easily along the shoreline, but the sediment must be obtained in deeper water, 25 m out from the oyster stations. Station 1 is on the west side of the bridge, extending from the northwest end of the bridge to the public launching ramp further to the north. Station 2 is located under the bridge (50 m east southeast of Station 1) and extends into the enclosed part of the bayou to the east of the bridge. Station 3 is located inside the small basin, extending southwest from the southern end of the bridge.

#### **OYSTER COLLECTIONS**

- 1995 Small to medium sized oysters were abundant, attached to the rocks and debris along the shoreline, as well as on the bridge pilings.
- 1996 No collection.
- 1997 The oysters varied considerably in size (1 - 10 cm) but were very scarce and attached to the rocks and bricks of the intertidal zone.

#### **SEDIMENT COLLECTIONS**

- 1995 The black silty mud is extremely anaerobic with a pungent odor. The samples were collected at the east end of Offatts Bayou, some 25 m out from each oyster station.
- 1996 No collection.
- 1997 The sediments were taken by grab from the boat at 29° 16.92' N, 94° 50.56' W. The texture was like gelatinous, the color was black and the sediments exhibited a bad odor.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m, and subtidal, 7.0 m.

**SITE** - CONFEDERATE REEF, GALVESTON BAY, TX

**SITE CODE** - GBCR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 29° 15.80' N

94° 54.98' W

**LOCATED ON NOAA CHART** - 11322 and 11324

**SITE ACCESS** - The site is accessed via small boat, launched at the TAMU Mitchell Campus boat basin on Pelican Island. From there, proceed west under the Pelican Island Bridge and continue west into the ICWW. Proceed under the railway bridge and the U.S. Hwy. 45 Galveston Bridge to the green can "27", then go south-southeast down the channel into Offatts Bayou. At red channel marker "8", proceed southwest about 2 mi to the site. Care should be taken here as there are numerous shallow reefs and obstructions that are not adequately marked on the charts. Alternate boat ramps are available at the south end of the Galveston bridge, and in Offatts Bayou.

**SITE DESCRIPTION** - The site is an intertidal reef at the east end of West bay, between South Deer Island and the shoreline to the south, and approximately 0.5 mi north from the entrance to Hance Bayou. The reef is heavily utilized by commercial and private fisherman. The oyster stations were established along the exposed edge of the intertidal reef. Station 1 is located on the eastern tip of the reef, Station 2 is in the middle, 100 m west of Station 1 and Station 3 is at the west end of the reef, 100 m west of Station 2.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were abundant along the reef, occurring in singles and clusters.
- 1996 No collection.
- 1997 The site had a lot of freshly dead oysters. Sizes ranged from small to large. A single composite (no station differentiation) was taken.

#### **SEDIMENT COLLECTIONS**

- 1995 The light brown to dark grey sandy mud sediment samples were collected some 75 m to the north of each oyster station, in slightly deeper water.
- 1996 No collection.
- 1997 The sediments were collected by grab at 29° 15.55 N, 94° 55.49' W, and were dark brown and grey silts.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - stainless steel sediment grab and Teflon coated scoop.

**WATER DEPTH** - intertidal, 0 to 0.4 m

**SITE** - FREEPORT SURFSIDE, BRAZOS RIVER, TX

**SITE CODE** - BRFS

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 55.27' N

95° 20.37' W

**LOCATED ON NOAA CHART** - 11322

**SITE ACCESS** - This intertidal site is accessed by boat, launched at the Bridge Bait boat ramp under the Texas Hwy. 332 Surfside Beach bridge, over the ICWW. Proceed southwest down the ICWW, about 6 mi to the Bryan Beach pontoon bridge.

**SITE DESCRIPTION** - The site is located in an old housing development with silted-in boat basins, south of the ICWW and just to the east of the FM 1495 drawbridge. The area can be accessed by foot from FM 1495, but the sediments are extremely soft and it is easier to work from a small boat. Station 1 is located on the south side of the ICWW, on the bulkheads on the west side of the marina entrance. Station 2 is located on the wooden pilings and concrete rubble on the east side of the marina entrance, and Station 3 is situated on the southern bulkhead just inside the marina entrance.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were particularly abundant, and could be easily collected by hand at low tide. They were attached in singles and clusters to the wooden pilings and concrete rubble forming the marina bulkheads.
- 1996 No collection.
- 1997 The small to medium oysters were found in clumps and were very fragile (thin shelled). A single composite was taken from the rubble and bricks of the intertidal.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediment samples were collected at the same locations as were the oysters. The sediments were a soft olive brown mud, containing some red silty clay.
- 1996 No collection.
- 1997 The sediments were taken by hand, co-located with the oysters. The dark brown mud had some clay and small to large size shell hash.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - CEDAR LAKES, BRAZOS RIVER, TX

**SITE CODE** - BRCL

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 51.48' N

95° 27.88' W

**LOCATED ON NOAA CHART** - 11322

**SITE ACCESS** - This intertidal site is accessed by boat launched at the public boat ramp at the end of the road on FM 2918, southeast of Rivers End. An alternate boat ramp is located under the Surfside Beach bridge over the ICWW. From there, travel southwest down the Waterway to the intersection of the San Bernard River, at Rivers End. Then proceed southwest across the ICWW to the east entrance to Cedar Lakes. Then travel west-southwest down the old silted-in channel for approximately a mi, to where two promontories converge, one from the north and the other from the south. Care should be exercised when visiting this site as the area is very shallow and contains numerous oyster reefs.

**SITE DESCRIPTION** - This site is located on the east side of the San Bernard National Wildlife Refuge, near Rivers End, approximately 1.5 mi west of the San Bernard River. The site lies to the south of the ICWW, on the east side of Cedar Lakes. This area is predominated by very shallow bays with numerous oyster reefs surrounded by *Spartina alterniflora* marshland. Station 1 is located on the north side of the channel, opposite a steel piling just west of the two promontories. Station 2 is located between the two land masses, and Station 3 is 100 m east of Station 2, on the north side of the channel.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes are extremely abundant throughout the area, occurring in both singles and clumps. They were easy to collect at low tide, as they were all exposed on the intertidal reefs.
- 1996 No collection.
- 1997 The oysters were very scarce and in the size range 2-7 cm.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediments were collected at the same stations as the oysters. The sediments are a soft light brown mud with some shell hash.
- 1996 No collection.
- 1997 The sediments were collected by hand/scoop. Dark brown silt with some sand.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - EAST MATAGORDA, MATAGORDA BAY, TX

**SITE CODE** - MBEM

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 42.67' N

95° 53.00' W

**LOCATED ON NOAA CHART** - 11319

**SITE ACCESS** - The site is accessed via boat launched in Matagorda at the C&R Marina and Bait Camp, next to the Matagorda Drawbridge at the end of Texas Highway 60. Proceed east along the ICWW, through the flood locks, to the first cut to the south, which is a trip of about four and a half miles. Go through the Old Gulf Cut, and the site is slightly farther to the south in the East Matagorda Bay. There are a number of alternate boat ramps on the Colorado River, south of Matagorda on Farm Rd. 2031.

**SITE DESCRIPTION** - There are a number of exposed reefs that extended out from the Old Gulf Cut into East Matagorda Bay. There are six old wooden creosote pilings to the left of the cut. Station 1 is located 300 m to the southeast, Station 2 is 100 m southeast from the pilings and Station 3 is about 100 m to the south of the pilings.

#### **OYSTER COLLECTIONS**

- 1995 Oysters were extremely scarce across the entire region, with all of them having very brittle shells. There was also a high percentage of clean dead shells, suggesting that there had been a recent die-off.
- 1996 No collection.
- 1997 The population was abundant with many in the 4-8 cm size. Oysters were primarily singles.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediment samples were collected at the same stations as were the oysters. The sediments were a light brown sandy silt.
- 1996 No collection.
- 1997 The sediments were collected from the intertidal at the same locations as the oysters. Sediment was primarily silt with a dark brown color.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - Stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - DOG ISLAND, MATAGORDA BAY, TX

**SITE CODE** - MBDI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 38.42' N

96° 00.47' W

**LOCATED ON NOAA CHART** - 11319

**SITE ACCESS** - The launch point for access to this site is at the public boat ramp on the Colorado River, off Farm Rd. 2031 south of Matagorda. Proceed northwest up the river to the ICWW, then southwest through the flood locks and about 2 mi along the ICWW to Culver Cut. Go south through the cut to the first fork and then east into the eastern end of Matagorda Bay. Proceed down the shallow channel to the second PVC pipe then due south to the sunken barge, which is some 200 m from shoreline.

**SITE DESCRIPTION** - This intertidal site is located at the eastern end of Matagorda Bay, near Dog Island Reef. The reef lies just to the east of the sunken barge, and is clearly visible at low tide. Numerous white PVC poles mark the shallow channel, and the oyster reef to the east. Station 1 lies at the southern end of the reef, Station 2 is in the middle and Station 3 is at the northern end of the intertidal reef.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were abundant throughout the entire reef, occurring in singles and clusters. They are easily collected by hand at low tide.  
1996 No collection.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediment samples were collected at the same stations as were the oysters. The sediments were a light brown silty clay.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - TRES PALACIOS BAY, MATAGORDA BAY, TX

**SITE CODE** - MBTP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 38.98' N

96° 14.01' W

**LOCATED ON NOAA CHART** - 11317

**SITE ACCESS** - The site is accessed by small boat launched at the public boat ramp in Palacios, off Texas Hwy. 35. Proceed southwest down the Palacios Channel for 2 nm to the red channel marker "42", then southeast 1 mi across the bay to the Coon Island Reef (15 min run time).

**SITE DESCRIPTION** - The intertidal site is located on a long string of reefs across the mouth of Coon Island Bay. The reefs extend from Oliver Point northeast to Coon Island, enclosing the bay. There is an old gas production platform about 100 m to the west of Station 1, which lies to the northeast of Coon Island. Station 2 lies about 100 m to the east of Station 1, and Station 3 lies a further 75 m to the east.

#### **OYSTER COLLECTIONS**

- 1995 Oysters were scarce across the entire reef, but did occur in all size ranges. There was a particularly good crop of spat on the reef.
- 1996 No collection.
- 1997 The oysters were abundant and found in clumps. Very few singles were present.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediment samples were collected at the same stations as were the oysters. The sediments were a light brown silty clay, with lots of shell hash.
- 1996 No collection.
- 1997 Sediments were collected by hand using a scoop at the same locations as the oysters. Texture was sand and silt, and the color was dark brown.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - CARANCAHUA BAY, MATAGORDA BAY, TX

**SITE CODE** - MBCB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 39.90' N

96° 22.98' W

**LOCATED ON NOAA CHART** - 11317

**SITE ACCESS** - The site can be easily reached by land from Hwy. 35, east of Port Lavaca. Turn south (right) on Hwy. 1862d where it intersects Hwy. 35. Turn right onto Jackson County Rd. 476, and then left (south again) onto Jackson County Rd. 477. Turn right onto Bay Ave. and go to the end of the road. The site is located approximately 100 m to the west.

**SITE DESCRIPTION** - The site is located on the east side of Carancahua Bay, directly across the bay from Port Alto. This intertidal shoreline site is located in a small cove to the west of the white house at the end of the road, and can easily be sampled from shore at low tide. Station 1 is 10 to 20 m off the shoreline on a small reef paralleling the shore for approximately 80 m. The oysters were found on the bottom or attached to old shell. Station 2 is on the small promontory, which extends approximately 100 m out into the bay to the southwest. Here, the oysters were attached to the concrete and brick rubble. Station 3 is located southeast of Station 2 on an intertidal reef approximately 20 m out from the shoreline.

#### **OYSTER COLLECTIONS**

1995 Single, medium sized oysters were abundant throughout the site.

1996 No collection.

1997 Medium to large oysters were very abundant.

#### **SEDIMENT COLLECTIONS**

1995 The sediment samples were collected at the same stations as were the oysters. The sediments were a light brown silty clay in nature.

1996 No collection.

1997 Sediments were collected by hand at locations coincident with the oyster collection along the shoreline.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand using a Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m



**SITE** - GALLINIPPER POINT, MATAGORDA BAY, TX

**SITE CODE** - MBGP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 34.73' N

96° 33.78' W

**LOCATED ON NOAA CHART** - 11317

**SITE ACCESS** - The site is accessed by boat launched at the Port Lavaca State Park boat ramp. Follow the marked channel down to Gallinipper Point, which is to the south of green channel marker "65" on the Port Lavaca Channel. An alternate, closer launch site is in the Harbor of Refuge, with a marked channel leading out to Gallinipper Point.

**SITE DESCRIPTION** - This site is a submerged reef off the north shore of Gallinipper Point. The reef runs on a line from the Aluminum Plant/Range Marker to a house on the shoreline that has an asymmetrically pitched roof (Geodesic Dome) and a fireplace chimney. The reef lies to the south of green channel marker "65", and extends to about 400 m offshore. Station 1 is 100 m south of the range marker, Station 2 being the midpoint, and Station 3 being 150 m offshore from the house.

#### **OYSTER COLLECTIONS**

- 1995 Oysters were numerous this year, with an abundance of old oyster shell on the site.  
1996 No collection.  
1997 Oysters were scarce in comparison to abundance of previous years. Oysters were small to medium size, with very few large individuals. Oysters were primarily found in clumps, as opposed to single individuals, and there were many freshly dead empty shells.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediments were an extremely anaerobic silty mud, dark grey in color, with some clay present.  
1996 No collection.  
1997 Sediments were collected in the vicinity of the oyster site, approximately 20 m south of the navigational range marker in approximately 20 m of water. The dark brown silt had some clay present.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge  
Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - subtidal, 2.0 m

**SITE** - BILL DAYS REEF, ESPIRITU SANTO, TX

**SITE CODE** - ESBD

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 24.71' N

96° 26.94' W

**LOCATED ON NOAA CHART** - 11319

**SITE ACCESS** - Access to the site is gained by boat, launched from the public boat ramp on the ICCW at Port O' Connor. Head south across the ICCW and through Fisherman's Cut into Barroom Bay, then proceed southwest across the bay to the Mailboat Channel. Bill Days Reef is situated to the southwest side of the channel, to the northeastern end of Espiritu Santo Bay.

**SITE DESCRIPTION** - The reef is oriented almost east-west. Station 1 is on the west end of the reef at a bearing of 360° toward the Port O' Connor water tower and 340° toward the Milchem tanks which are 250 m away from the reef; Station 2 was 100 m to the east in the center of the reef, in line with the west end of Bill Days Reef and the tall tower to the west; and Station 3 was 100 m to the east of Station 2.

#### **OYSTER COLLECTIONS**

- 1995 Oysters were particularly abundant on the reef, with all stages of development well represented.
- 1996 The original reef was devoid of live oysters, so the site was moved a short distance to another oyster reef. The new reef is located about 2 mi further to the west-southwest of the original site. From the boat ramp, proceed about 4 mi southwest along the ICWW to the Ferry Channel Cut, then head south into Espiritu Santo Bay and down the channel to the green channel marker "7", where the reef is located. Station 1 is next to the marker, Station 2 is 75 m further north and Station 3 is yet another 75 m to the north. Small to medium sized oysters were abundant throughout area, occurring in large clumps.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediments were composed of loose gray silt over gray sandy clay.
- 1996 The sandy sediment sample contained some clay, shell and organics. The sample was collected as a composite from all three of the oyster Stations.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - hand using a Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.3 m

**SITE** - SOUTH PASS REEF, ESPIRITU SANTO, TX

**SITE CODE** - ESSP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 17.89' N

96° 37.32' W

**LOCATED ON NOAA CHART** - 11315

**SITE ACCESS** - The site is accessed by boat launched at Swan Point, near Seadrift. Proceed southeast on the Victoria Barge Canal to the ICWW and then east to the site. Alternative launch ramps are at the Snapper Snatcher Dock or Doc's Doc in Port O' Connor further to the east along the ICWW. South Pass Island, a few hundred meters to the southeast of the site, is an oil production site and has a compressor station and buildings. Approximate run time to the site is about 30 min.

**SITE DESCRIPTION** - The site is located between Grass Island on the north and Steamboat Island on the south. The site is composed of a series of low exposed reefs 105° from the pumping station, 240° from the water tower and 150° from the southeastern most point of Steamboat Island. The sample area is an intertidal reef that is actually just off Steamboat Pass and is not in South Pass at all. Station 1 is on the reef, northwest of the tanks and west of a small island where station 3 was located. The three tanks at the production facility are located on a bearing of 130° to the Station. Station 2 is due east of Station 1 on a small island, just north of the production facility and 180° to the channel marker pole. Station 3 is northeast of the storage tank island, in line with the island with the Yucca plants growing on it.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were fairly numerous in the area, with a great deal of shell.
- 1996 Small to medium sized oysters in singles and clumps are abundant across the entire area of the site.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediments are a loose gray mud, overlain by a loose brown silty mud.
- 1996 The silty sand sediment sample contained some shell and organics. The sample was collected as a composite from all three of the oyster Stations.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - hand, Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.3 m

**SITE** - MOSQUITO POINT, SAN ANTONIO BAY, TX

**SITE CODE** - SAMP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 20.64' N

96° 42.74' W

**LOCATED ON NOAA CHART** - 11315

**SITE ACCESS** - Access is by boat launched at Seadrift (Haynies Seafood or the public ramp at Swan Point), alternate launching ramps are in either Port O' Connor or Port Lavaca. Run time by boat from Seadrift is 30 min, 2 to 3 hrs from Port Lavaca, or 1 hr from Port O' Connor. From Swan Point, near Seadrift, exit the channel, which is very shallow at low tide, and proceed southeast down the Victoria Barge Canal to green channel marker "15". At the marker, turn south-southwest and travel the half-mile to the exposed reef.

**SITE DESCRIPTION** - The site is located off Mosquito Point west of the Victoria Barge Canal and south-southwest of channel marker "15". Oysters are collected on the exposed intertidal reef. There is an old six legged wooden platform about 80 m to the southeast of the reef. There are no other good landmarks on the nearby shoreline for reference. Station 1 was on the north end of the reef, Station 2 was on the middle part of the exposed reef, and Station 3 was on the southwest end of the reef.

#### **OYSTER COLLECTIONS**

- 1995 Live oysters were very scarce this year, and were either medium or large in size. No spat were to be found amongst all of the dead shell.
- 1996 Small to medium sized oysters were scarce on the reef.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediments were collected in subtidal areas adjacent to the oyster stations, from the mud and sand bottom. Station 1 is on the west side 15 m out from the reef. Station 2 is about 50 m south from Station 1 (intertidal) and Station 3 is 200 m farther south. The sediments are a dark brown silty mud with some clay.
- 1996 The dark gray silty sediment sample was collected 50 m northeast of the oyster reef.
- 1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.3 m

**SITE** - PANTHER PT. REEF, SAN ANTONIO BAY, TX

**SITE CODE** - SAPP

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 13.94' N

96° 42.49' W

**LOCATED ON NOAA CHART** - 11315

**SITE ACCESS** - Access to the site is by boat launched at Seadrift (Haynies Seafood or the public ramp at Swan Point), alternate ramps are at Port O' Connor (Doc's Doc) or in Port Lavaca. Run time by boat from Seadrift is 30 min, 2 to 3 hrs from Port Lavaca, and 1 hr from Port O' Connor. Do not use the Swan Point ramp at low tide, as the surrounding area is very shallow. Travel down the Victoria Barge Canal to the ICWW, then proceed west along the Waterway to the green can buoy "17". The subtidal reef runs south from here towards Panther Point. The site is located on the reef just north-northwest of Panther Point.

**SITE DESCRIPTION** - Station 1 on the submerged reef is located 300 to 400 m from a production platform at a bearing of 260° and 100 m from the black and white PVC pole marking the top of the reef. Station 2 was 100 m to the southeast (bearing 150° ) between the two white PVC poles on the west side of the reef. Station 3 was another 200 m farther south (bearing 150°) from Station 2. Oysters and moderately dense "grass beds" were widely dispersed on the sandy bottom.

#### **OYSTER COLLECTIONS**

- 1995 Oysters of all sizes were abundant all along the reef this year, along with dense patches of shell and shell hash.
- 1996 Small to medium sized oysters occurring in clumps and singles were abundant throughout the area.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediments are a dark black silty mud.
- 1996 The dark gray silty sediment sample was collected from the north end of the reef.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge
- Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - subtidal, 1.0 - 2.0 m

**SITE** - AYRES REEF, MESQUITE BAY, TX

**SITE CODE** - MBAR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 10.38' N

96° 50.10' W

**LOCATED ON NOAA CHART** - 11315

**SITE ACCESS** - The site is accessed via boat, launched at the Sandollar Pavilion in Fulton Beach, Texas. Go east to the ICWW and follow the Waterway northeast to the green channel marker "3". Turn southeast into the cut leading into Ayres bay then run the 1.5 mi to the reef, bearing 160° . The total run time to the site is at least an hour in good weather.

**SITE DESCRIPTION** - This site is located on the northeast side of Mesquite Bay, between Matagorda Island to the southeast and the Aransas National Wildlife Refuge to the north/west. The reef is oriented in a northwest/southeast direction and the site is located in the middle of the reef at Ayres Dugout. There are two small buildings with antennas, 400 m to the southeast of the site. Station 1 is on the east end of the Dugout Cut. Station 2 is in the middle of the Cut and Station 3 is on the west portion of the Cut. All three of the stations were collected within a 100 m radius.

#### **OYSTER COLLECTIONS**

- 1995 The oysters were all very small and extremely scarce on the reef. There has been a problem of silting in the area for some time now, with the oysters being smothered by a fresh layer of silt.
- 1996 No collection.
- 1997 The oysters were very abundant and found in small clumps in the intertidal portions of the reef. Size collected was 3-7 cm.

#### **SEDIMENT COLLECTIONS**

- 1995 The dark grey silty sediments were collected at the same stations, as were the oysters.
- 1996 No collection.
- 1997 The sediments were collected at the same locations as the oysters, using the sediment scoop. The sandy silt was light brown in color.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - LONG REEF, ARANSAS BAY, TX

**SITE CODE** - ABLR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 03.29' N

96° 57.07' W

**LOCATED ON NOAA CHART** - 11314

**SITE ACCESS** - The site is located across Aransas Bay almost due east from Fulton. To reach the site, the boat is launched at the Sandollar Pavilion boat ramp near the harbor. Travel east across the bay to the ICWW then proceed northeast to green channel marker "25", which is at the northwestern end of the reef. The run time to the reef is less than 30 min.

**SITE DESCRIPTION** - The reef extends southeast from Deadman Island, near the green channel marker "25", to Big Island, which is just off San Jose Island. The reef is both intertidal and subtidal and incorporates a few small shell hash islands. There are numerous white PVC and cane poles that adequately mark the reef. Station 1 is at the northwestern end of the reef, Station 2 is in the middle and Station 3 is towards the southeast. The three stations are all 50 m apart from one another.

#### **OYSTER COLLECTIONS**

- 1995 The reef is particularly good for sampling, with an abundance of large single oysters.
- 1996 No collection.
- 1997 The oysters were very scarce, but occurred in a wide range from spat to large adults. Visual search and dredging was done for a long time to get sufficient numbers for a single composited sample (no distinct stations).

#### **SEDIMENT COLLECTIONS**

- 1995 Sediment samples are not easy to collect on this site, as the substrate is basically oyster shell hash with very little else. The sediment samples were collected from the intertidal sections of the reef, next to the oyster collection stations.
- 1996 No collection.
- 1997 The sediments were light brown silt collected from the subtidal portions of the reef.

#### **SAMPLING METHODS**

- Oysters - stainless steel dredge, hand
- Sediment - stainless steel sediment grab and Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m and subtidal, 0.8 - 2.0 m

**SITE** - COPANO REEF, COPANO BAY, TX

**SITE CODE** - CBCR

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 28° 08.52' N

97° 07.68' W

**LOCATED ON NOAA CHART** - 11314

**SITE ACCESS** - The site is located on the north side of Copano Bay at Copano Point. A boat must be used to reach the site and can be launched at Pouzee's Marina at Lone Tree Point, Rockport. From Pouzee's, go northwest to Copano Reef, an exposed intertidal reef.

**SITE DESCRIPTION** - The reef runs some 400 m southeast from Copano Point and was located around the white pole with Texas Parks and Wildlife marker "Copano Reef." Numerous white PVC poles mark the western edge of the reef. This reef has been on the decline for a number of years now.

#### **OYSTER COLLECTIONS**

- 1995 There were very few live oysters to be had in the area and those found were all very small or were spat. There were a number of medium sized oysters shells that looked as though they had been recently killed, possibly from excessive freshwater run-off.
- 1996 No collection.
- 1997 The oyster population was very good. New growth was good and the oysters looked healthier than any others from this region of the study area.

#### **SEDIMENT COLLECTIONS**

- 1995 The sediment samples were taken from the same general area as were the oyster samples, some 10 m off the reef. The sediments were dark gray-black anaerobic mud with little silt.
- 1996 No collection.
- 1997 The sediments were taken by grab sampler from a location approximately 50 m west of the oyster collections in water depth of 1 meter. The sediment was light grey silt with some clay.

#### **SAMPLING METHODS**

- Oysters - hand  
Sediment - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - HARBOR ISLAND, ARANSAS BAY, TX

**SITE CODE** - ABHI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 50.33' N

96° 04.52' W

**LOCATED ON NOAA CHART** - 11314

**SITE ACCESS** - The collection site is located on Mustang Island on the south side of the ICWW directly across from Harbor Island. The site is at a public access area near fishing piers and is reached by crossing the Port Aransas ferry and traveling west past the University of Texas Marine Sciences building to the end of the paved road. The site is north of the sand parking lot.

**SITE DESCRIPTION** - Oysters were attached to rip-rap and rubble material around the base of the piers. Oysters were generally small and not abundant; collections would be best made at low tide, since the oysters were growing on bottom rubble.

#### **OYSTER COLLECTIONS**

1995 No live oysters could be found in the area.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - NA

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - INGLESIDE COVE, CORPUS CHRISTI, TX

**SITE CODE** - CCIC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 50.28' N

97° 14.28' W

**LOCATED ON NOAA CHART** - 11309

**SITE ACCESS** - To reach the site, a boat can be launched at the public boat ramp at Ingleside-On-The-Bay, located on Fm. Rd 1069. A 5 min ride across the La Quinta Ship Channel and Ingleside Cove is required to reach the site.

**SITE DESCRIPTION** - The site was located along the western side of Ingleside Cove channel and north of Ingleside Point on the south tip of the spoil island. Oysters were located on an exposed reef and on a mud flat that was exposed during normal low tides. The site was surrounded by submerged seagrass beds. Landmarks to locate the site include Ingleside Point to the south and the dredge spoil island to the north.

#### **OYSTER COLLECTIONS**

1995 No live oysters could be found in the area, only the remains of the shell reefs.  
1996 No collection.  
1997 No collection

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 Sediments were a light brown sand, collected in the intertidal portions of the reef where dead shells were located.

#### **SAMPLING METHODS**

Oysters - hand  
Sediment - hand held scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - NUECES BAY, CORPUS CHRISTI, TX

**SITE CODE** - CCNB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 51.13' N

97° 21.59' W

**LOCATED ON NOAA CHART** - 11309

**SITE ACCESS** - The site is located at Indian Point Marina on the north end of the U.S. Hwy. 181 bridge crossing Nueces Bay. There is a boat launch at the Gunderlands Boatland, in Corpus Christi.

**SITE DESCRIPTION** - The site was located 200 m due east from the boat ramp at Gunderlands Boat Works, on the shoreline. The area is very shallow, with numerous exposed oyster reefs and rubble. These reefs had very few live oysters. The collection stations are located along the shoreline on the north side of the road.

#### **OYSTER COLLECTIONS**

1995 Due to the scarcity of the medium sized oysters, one composite sample was collected. Small thin-shelled oysters were collected along the mud shoreline or on pilings. Oysters were intertidal and seemed to be on the decline.

1996 No collection.

1997 The oysters were very scarce and were found attached to old tires and the pilings of the bridge.

#### **SEDIMENT COLLECTIONS**

1995 Sediment samples were collected in the same general area as were the oysters. The sediments were a medium dark brown silty clay.

1996 No collection.

1997 Sediments were collected by hand using a scoop. The light grey silty sands had a noticeably bad odor.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - BOAT HARBOR, CORPUS CHRISTI, TX

**SITE CODE** - CCBH

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 27° 50.17' N

97° 22.81' W

**LOCATED ON NOAA CHART** - 11309

**SITE ACCESS** - This site is located on the northeast end of Rincon Point, at the junction of Nueces and Corpus Christi Bays. The site is reached by exiting off of U.S. Hwy. 181 at the Shamrock Station in Corpus Christi, and driving under the bridge as if going to the boat harbor north of the Corpus Christi Ship Channel. The site can be reached on foot and collection is easy at low tide.

**SITE DESCRIPTION** - The site is located under the Hwy. 181 bridge over Corpus Christi Bay. Oysters were found along the shoreline and were attached to concrete and brick rubble. The oysters were either single or in clumps. The bottom was a mixture of sand, shell, mud, trash, and concrete rubble.

#### **OYSTER COLLECTIONS**

1995 Oysters were mainly medium sized and extremely scarce. The oysters were attached to the concrete and brick rubble found along the shoreline.

1996 No collection.

1997 Oysters again were scarce and attached to rocks, rubble and cables along the shoreline. Though variable in size, most were small.

#### **SEDIMENT COLLECTIONS**

1995 Sediment samples were collected at the same stations as the oysters.

1996 No collection.

1997 Sediments were light grey with sand and silt. Collections were by hand/scoop at the oyster location.

#### **SAMPLING METHODS**

Oysters - hand

Sediment - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.5 m

**SITE** - ARROYO COLORADO, LOWER LAGUNA MADRE, TX **SITE CODE** - LMAC

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 16.95' N 97° 17.12' W

**LOCATED ON NOAA CHART** - 11303

**SITE ACCESS** - Access to the site is by boat launched at the White Sands Marina in Port Isabel. Travel north up the ICWW to the site. Travel time is 45 min.

**SITE DESCRIPTION** - This collection site is located at cabins along the ICWW. Station 1 is located at the first cabin 1399 (tan with brown trim, may have lost house number), which is just north of green channel marker "45" and west of Primero Island. Station 2 is at cabin 1423. The cabin is between green channel marker "41" and green channel marker "43". Station 3 is located north of marker "41" at cabin P1345. The oysters are attached to the concrete and wooden pilings, and on the mud flats which are exposed at low tide.

#### **OYSTER COLLECTIONS**

1995 No live oysters could be found in the vicinity of the site this year.  
1996 There was a good population of small to medium sized oysters in the area.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection  
1997 No collection.

#### **SAMPLING METHODS**

Oysters - hand  
Sediments - NA

**WATER DEPTH** - intertidal, 0.25 - 0.5 m

**SITE** - PORT ISABEL, LOWER LAGUNA MADRE, TX

**SITE CODE** - LMPI

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 04.49' N

97° 11.97' W

**LOCATED ON NOAA CHART** - 11302

**SITE ACCESS** - Access to the site is by foot across the former Queen's Point Marina parking lot in Port Isabel. The marina was destroyed in a storm many years ago, and only the bulkheads and some slips remain.

**SITE DESCRIPTION** - This collection site is located on the south jetty and bulkheads of the Queen's Point Marina. The oysters are attached to the concrete and are exposed at low tide. Numerous shells are present but a high proportion of the oysters found here were dead and the live oysters were very thin-shelled. Careful handling was required while collecting, to avoid breaking the live oysters.

#### **OYSTER COLLECTIONS**

- 1995 Station 1 oysters were collected from the first set of bulkheads coming into the small yacht basin. Station 2 oysters were taken from the concrete pilings at the Phillips 66 boat ramp and Station 3 oysters were from the concrete wall 50 m north of the Station 2 boat ramp.
- 1996 There were only a few very small thin shelled oysters to be found in the area. Many of the shells seemed to be from oysters that died recently.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediment samples were collected at each of the three oyster stations, using a small Teflon scoop. The sediments were a light brown silty sand.
- 1996 The gray-brown silty sand sediment sample had no noticeable odor and was collected just off the nominal site center.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, 0.5 m

**SITE** - SOUTH BAY, LOWER LAGUNA MADRE, TX

**SITE CODE** - LMSB

**TARGET SPECIES** - *Crassostrea virginica*

**NOMINAL SITE CENTER** - 26° 02.59' N

97° 10.56' W

**LOCATED ON NOAA CHART** - 11302

**SITE ACCESS** - There are a number of marinas and boat ramps in the Padre Island area, including a public boat ramp on South Padre Island at the Isla Blanca Pier. Travel time to South Bay is about 25 min, depending on the weather. Landmarks used to locate the reef are 145° from the middle of the causeway bridge and 90° from the navigational range marker. There are numerous South Padre Island hotels and condominiums that lie due north of the site. The water depth is very shallow and requires the use of a shallow draft vessel.

**SITE DESCRIPTION** - The oysters were located in clumps on the extensive intertidal mud flats and reefs, south of Clark Island on the northeast side of South Bay, which are fully exposed at low tide. The dense clumps of oysters were mostly a conglomeration of dead shells, with the live oysters growing on the old shells.

#### **OYSTER COLLECTIONS**

- 1995 Station 1 oysters were collected from the southern end of the north/south oriented reef. Station 2 oysters were collected 100 m north of Station 1 and Station 3 oysters were collected from the northern end of the reef.
- 1996 There was a good population of oysters in large clumps across the entire mudflat.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 Sediments were collected at each of the three oyster stations, using a small Teflon coated scoop. The sediments were a light brown silty clay.
- 1996 The gray-brown silty sediment sample had no noticeable odor and was collected from the nominal site center.
- 1997 No collection.

#### **SAMPLING METHODS**

- Oysters - hand
- Sediment - hand, Teflon coated scoop

**WATER DEPTH** - intertidal, 0 - 0.3 m

## CALIFORNIA SITES

**SITE** - NORTH JETTY, IMPERIAL BEACH, CA

**SITE CODE** - IBNJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 32° 35.26' N

117° 08.01' W

**LOCATED ON NOAA CHART** - 18772

**SITE ACCESS** - This site is located on a jetty at the north end of Imperial Beach. From Interstate 5 south in Imperial Beach, take the Palm Ave. exit west to Seacoast Drive. Turn right (north) onto Seacoast Drive and park near Carnation Ave. Walk to the end of Carnation Ave. and around the vehicle gate. The jetty is to the right (north) approximately 150 m.

**SITE DESCRIPTION** - The site center is below the tallest rock on the jetty, approximately 2/3 of the way out to the seaward end of the jetty. The three discrete collection stations are on the south side of the jetty, with the middle station located directly below the site center, and the other two stations approximately 15 m inshore and offshore of the center station.

### BIVALVE COLLECTIONS

- 1995 *M. californianus* was the target species and they were present in high numbers and in a wide range of sizes. Collected organisms ranged from approximately 50–80 mm in shell length.
- 1996 No collection.
- 1997 Sampling conditions were identical to those experienced in 1995. Organisms were abundant from the subtidal to +1.5 m MLW.

### SEDIMENT COLLECTIONS

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

### SAMPLING METHODS

Bivalves - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - CORONADO BRIDGE, SAN DIEGO BAY, CA

**SITE CODE** - SDCB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 32° 41.19' N

117° 09.55' W

**LOCATED ON NOAA CHART** - 18773

**SITE ACCESS** - This site is located on the Coronado Bridge across San Diego Bay. From Interstate 5 south in San Diego, take the Rosecrans (Hwy. 209) exit and proceed south approximately 3 mi to Shelter Island Drive. Turn left (east) onto Shelter Island Drive (note that a right turn at the intersection puts you onto Byron St.) and proceed east to the rotary. The launch ramp is just to the right of the rotary. Take the boat east from the launch ramp, around the north end of North Island and then south to the Coronado Bridge (about a 20-min ride).

**SITE DESCRIPTION** - The concrete bridge supports are numbered consecutively, with the lowest numbers on the western side of the channel. The site center is bridge support 10, with samples being collected from the west side of supports 9, 11 and 12.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus edulis* was plentiful on the bridge supports and had oysters or scallops, barnacles and the green alga *Ulva* growing on them. Collected organisms ranged from approximately 35–60 mm in shell length.

1996 No collection.

1997 *M. edulis* was very plentiful as in 1995. The mussels were the highest assemblage in the intertidal zone.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.75 m MLLW

**SITE** - LIGHTHOUSE, POINT LOMA, CA

**SITE CODE** - PLLH

**TARGET SPECIES** - *Mytilus Californianus*

**NOMINAL SITE CENTER** - 32° 40.83' N

117° 14.93' W

**Sediment site center** - 32° 37.0' N

117° 15.7' W

**LOCATED ON NOAA CHART** - 18773

**SITE ACCESS** - From Interstate 5 in San Diego, take the Hwy. 209 (Rosecrans) exit south. Follow Hwy. 209 to the Cabrillo National Monument. Hwy. 209 follows, in sequence, Rosecrans St., Cañon St., Catalina Boulevard, and Cabrillo Memorial Drive. Just prior to the gate into Cabrillo National Monument, take the road to the right past the lighthouse to the Point Loma Wastewater Treatment Plant. At the lighthouse, follow the road as it doubles back toward the north to the treatment plant. Check in at the Administration Building. At the Administration Building, take the left fork and head down toward the water. Proceed to where the road ends, adjacent to a concrete spillway that directs storm runoff from the street down toward the ocean. Climb down the boulders below the spillway to a series of rock benches 10–15 m south.

**SITE DESCRIPTION** - The site center is the highest bluff above the cliff, 10 m south of the end of the road. Collection stations are on the rocky benches at the base of the cliff below the bluff. The site is too small and the mussels were too sparse to support designation of discrete collection stations.

The sediment site is located approximately 3 miles offshore and is accessed by boat launched at Shelter Cove Marina.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus californianus* was collected from the sparse population of small organisms distributed among the turf of corraline algae on the rock benches. *M. edulis* was also observed, so care was necessary to prevent mixing both species in the sample.

1996 No collection.

1997 *M. californianus* was collected from dense populations that were limited to a few pockets of distribution on the horizontal surfaces of the rock outcrop bench, approximately 1 meter above MLW. Few *M. edulis* were observed, but gooseneck barnacles were abundant among the mussels.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected with a stainless grab in approximately 160 m of water. The site was located 3.4 nm from channel marker #7 at Point Loma entrance on a true bearing of 196° .

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless grab and Teflon coated scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - HARBOR ISLAND, SAN DIEGO BAY, CA

**SITE CODE** - SDHI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 32° 43.48' N

117° 11.68' W

**Sediment site center** - 34° 43.16' N

117° 11.62' W

**LOCATED ON NOAA CHART** - 18773

**SITE ACCESS** - This site is on the south shore of Harbor Island at the north end of San Diego Bay. From Interstate 5 south in San Diego, take the Sassafras St. exit and follow the signs toward San Diego Airport. On Harbor Drive near the airport, take the Harbor Island exit. When the road ends at the water, take Harbor Island Drive to the left (east). Park in the first pull-out, just past the first palm tree east of the intersection.

**SITE DESCRIPTION** - The site center is a pyramid-shaped rock at 0 m MLLW on the steep boulder-covered bank between the palm tree and the first sidewalk bench west of the palm tree. The middle discrete collection station was the pyramid-shaped rock, with the other two stations being approximately 20 m on either side.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus edulis* occurred in clusters in crevices between cobbles that covered the steep bank. Searching was required to collect sufficient numbers. Collected organisms ranged from approximately 30–50 mm in shell length.

1996 No collection.

1997 *M. edulis* was collected from the rocks as described above. Distribution was limited to the lower 1 meter of intertidal zone. Abundance was high.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected by grab from a boat adjacent to channel marker 21 opposite the bivalve collection site. Sediments were a grainy black mud with much evidence of tube worm activity. Water depth was approximately 15 m at the edge of the channel.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel grab and Teflon coated scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - VENTURA BRIDGE, MISSION BAY, CA

**SITE CODE** - MBVB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 32° 46.05' N

117° 14.52' W

**LOCATED ON NOAA CHART** - 18765

**SITE ACCESS** - This site is located at the Ventura Bridge over Mission Bay in San Diego. From Interstate 5 south in San Diego, take the Sea World Drive exit. Proceed west past Sea World to Ingraham St. Go north on Ingraham St. and turn left (west) at the first signal onto Dana Landing Rd. After Dana Landing Rd. curves to the left, the boat launch ramp is on the right. Proceed out of the harbor to the left (west) and go to the Ventura Bridge, less than 0.5 mi away.

**SITE DESCRIPTION** - The Ventura Bridge is supported by paired concrete pillars. The site center is the fourth pair of pillars from the east end of the bridge. Mussels were collected from the seaward sides of the bayward pillar in pairs 3, 4, and 5, counting from the east end of the bridge.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus edulis* was collected from this site. Both *M. edulis* and *M. californianus* occur at this site, so care must be taken to collect only *M. edulis*. Collected organisms ranged from approximately 35–60 mm in shell length.

1996 No collection.

1997 *M. edulis* was abundant in large clusters at the upper end of the intertidal zone.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.75 m MLLW

**SITE** - POINT LA JOLLA, LA JOLLA, CA

**SITE CODE** - LJLJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 32° 51.09' N

117° 16.43' W

**Sediment site center** - 32° 48.75' N

117° 19.72' W

**LOCATED ON NOAA CHART** - 18765

**SITE ACCESS** - This site is located on Point La Jolla, in La Jolla. From Interstate 5 in San Diego, take Ardath Rd. from the south, or La Jolla Village Drive from the north and go west to Torrey Pines Rd. Turn left onto Torrey Pines Rd. and proceed to Prospect St. Turn right onto Prospect St. and proceed to Coast Boulevard. Turn right onto Coast Boulevard and park as near as possible to the water in the vicinity of Ellen B. Scripps Park. At the life guard station near the north end of the park and the south end of La Jolla Cove, check in with the duty life guard, notifying them of the collection (La Jolla Cove is within a marine reserve). Go west from the lifeguard station on the walkway along the top of the shoreline and take the stairs down to the rock platform adjacent to the western-most rocky point.

**SITE DESCRIPTION** - The site is approximately 150–200 m west of the lifeguard station. There is no landmark that distinguishes the site center. The discrete collection stations were spaced approximately 20 m apart along the upper edge of the mussel beds nearest the tip of Point La Jolla. This site is approximately 0.25 mi west of the target site in La Jolla Cove, which could not be reached due to large swells that broke nearly continuously over the site.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus californianus* was plentiful at this site. Collected organisms ranged from approximately 45–70 mm in shell length.

1996 No collection.

1997 *M. californianus* was plentiful at this site.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected by stainless grab in approximately 70 m of water. The boat is launched at Dana Marina next to the Ventura Bridge in Mission Bay, and the site is 4.5 nm on a true bearing of 301° from the entrance to Mission Bay.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless grab and Teflon coated scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - MUNICIPAL BEACH JETTY, OCEANSIDE, CA

**SITE CODE** - OSBJ

**TARGET SPECIES** - *Mytilus californianus*/*M. edulis*

**NOMINAL SITE CENTER** - 33° 12.10' N

117° 23.62' W

**Sediment site center** - 33° 12.8' N

117° 28.33 ' W

**LOCATED ON NOAA CHART** - 18774

**SITE ACCESS** - This site is located on the jetty at the mouth of the San Luis Rey River in Oceanside. From Interstate 5 just north of Oceanside, take the Oceanside Harbor exit and go west to Harbor Drive. At Harbor Drive, take the left fork to the south. After the road curves to the right (west), park in the parking lot where Pacific St. ends at Harbor Drive. The jetty projects offshore from near the parking lot, adjacent to the mouth of the San Luis Rey River.

**SITE DESCRIPTION** - The site center is a large boulder next to a peace symbol carved into the concrete matrix atop the jetty, approximately 20 m from the seaward end of the jetty. Discrete collection stations were approximately 30 m apart on the north side of the jetty, with the outermost station being directly below the site center.

#### **BIVALVE COLLECTIONS**

1995 *Mytilus californianus* was collected from the north side of the jetty, with *M. edulis* also being present on the south side of the jetty.

1996 No collection.

1997 *M. californianus* was collected in the same location as in 1995.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected by stainless steel grab from a boat in approximately 56 m of water. Fine grained sediments are located 3.4 nm from the entrance to Oceanside Harbor on a true bearing of 262°.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless grab and Teflon coated scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - WEST JETTY, NEWPORT BEACH, CA

**SITE CODE** - NBWJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 33° 35.46' N

117° 53.40' W

**LOCATED ON NOAA CHART** - 18754

**SITE ACCESS** - This site is a walk-up, and is easily accessed by automobile. The site originally had the acronym - NBBC (1986-88). Follow Hwy. 1 south into Newport Beach, and take the Route 55 exit south onto Newport Blvd. Continue on down the Boulevard and out onto Balboa Island, where it runs into Balboa Blvd. Take a right onto Ocean Blvd. and proceed along the shoreline to the intersection of Channel Blvd. Park in the vicinity of the Channel Blvd. Park, and walk out to the jetty. There are a number of good boat ramps at the numerous marinas located in and around Newport Bay.

**SITE DESCRIPTION** - The site is located on the west jetty at the Balboa Channel Entrance to Newport Bay, in Newport Beach. The discrete stations are located along the west side of the west jetty, and are located about 25 m apart. Station 2 is the nominal site center, with Station 1 being inshore and Station 3 farther out.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of *M. californianus* mussels on the rocks of the jetty.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The brown sandy sediment sample was collected about 1/2 mi west of the distal end of the jetty, in 30 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - BIRD ROCK, SANTA CATALINA ISLAND, CA

**SITE CODE** - SCBR

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 33° 27.10' N

118° 29.24' W

**LOCATED ON NOAA CHART** - 18757

**SITE ACCESS** - This site can only be accessed by small boat. Take the ferry from Long Beach to Avalon. A permit from the Santa Catalina Island Conservancy is required in addition to the California State Dept. of Fish and Game Collection Permit. The Santa Catalina Island Conservancy staff will provide transport on request between Avalon and Two Harbors, as no private vehicles are allowed to drive around the island. A small boat and operator are available at the Wrigley Marine Science Center in Two Harbors, which is necessary to cover the short distance out to Bird Rock.

**SITE DESCRIPTION** - The site is located at the northwestern corner of Bird rock, on a small rock platform 1.5 m above MLLW. Landing on the island is tricky, as one has to jump from the small boat onto a small rock ledge, with all of the sampling supplies. There are a number of stainless steel survey grids in the inter-tidal area that have to be avoided. These areas are part of other research projects, and should not be disturbed in any way. Station 1 is located at the northwestern corner of the island, on the rock bench above the small cove (2nd landing site). Station 2 is on the rock bench at the extreme western end of the island, some 5 m west of Station 1. Station 3 is 5 m away from both stations 1 and 2 and still on the rock bench.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a fairly good population of small to medium sized *M. californianus* mussels on the island. Care has to be taken in identifying the mussels, as there is a large population of *M. edulis*.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - WEST JETTY, ANAHEIM BAY, CA

**SITE CODE** - ABWJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 33° 44.01' N

118° 06.06' W

**LOCATED ON NOAA CHART** - 18749

**SITE ACCESS** - The site is on a jetty adjacent to Anaheim Bay in Seal Beach. From Interstate 405 just south of its intersection with Interstate 605, take the Seal Beach Boulevard exit. Turn left (west) onto Seal Beach Boulevard. At the traffic lights, turn west onto 12th Ave. (Balboa Ave. goes to the east) and then left onto Ocean Ave. Then turn right (southwest) onto Neptune St. Park the car on Neptune St. and walk across the beach to the chain-link fence that runs out to the jetty. Walk around the end of the fence onto the jetty that projects southwards from the beach. A good public boat ramp is located on the Marina Stadium. Cross over the San Gabriel River going southeast on Hwy. 1, turn first left onto Marina Ave and then left again into the public boat ramp parking area.

**SITE DESCRIPTION** - The nominal site center is a large round timber wedged into the boulders of the jetty, whose top projects barely above the boulders. The site center is approximately 75 m from the end of the chain-link fence. The three discrete sampling stations are on the west side of the jetty, approximately 25 m apart. Station 1 is 40 m past the end of the fence, Station 2 is about 75 m past the end of the fence at the timber post and Station 3 is a further 25 m past Station 2. This site is very exposed and would be hazardous in heavy seas.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was abundant on the jetty boulders. Collected organisms ranged from approximately 50–80 mm in shell length.
- 1996 Both *M. edulis* and *M. californianus* mussels were abundant along the jetty rip-rap. *M. californianus* was abundant in all sizes and generally occurred in the more exposed rocky areas, with medium to large specimens being collected for the analysis.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The sediment station is located at 33° 44.26' N, 118° 07.83' W. The site is midway between the end of the western breakwater and Island Chaffee. The sediments were a fine olive-green silty mud.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.25 m MLLW

**SITE** - BREAKWATER, LONG BEACH, CA

**SITE CODE** - LBBW

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 33° 43.39' N

118° 10.41' W

**Sediment site center** - 33° 43.53' N

118° 10.38' W

**LOCATED ON NOAA CHART** - 18751

**SITE ACCESS** - This site can only be accessed by boat. It is located towards the western end of the eastern section of the Long Beach Harbor Breakwater. Head south along I-110 to where it ends and turn left onto Gaffey St. Follow Gaffey St. south, then turn left onto 27th St. and right onto Pacific Ave. At the lights, turn left onto Stephan M. White Drive (Cabrillo Beach sign) and left again onto Oliver Vickery Circle Way at the statue. Drive into the Park and follow the signs to the boat ramp, which is located in the northeastern corner. From the boat ramp, head east 5.5 mi across the harbor to the site.

**SITE DESCRIPTION** - The bivalve sampling site is located on the north side of the Long Beach outer breakwater. Station 1 is located at the nominal site center, Station 2 is 25 m to the east and Station 3 is 25 m to the west of Station 1.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of *M. californianus* mussels all along the inside of the breakwater.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected in about 16 m of water. The sediment site is about 200 m to the north of the bivalve site, near a small yellow marker float.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - FISHING PIER, SAN PEDRO HARBOR, CA

**SITE CODE** - SPFP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 33° 42.40' N

118° 16.45' W

**LOCATED ON NOAA CHART** - 18751

**SITE ACCESS** - This site has to be accessed by boat and is located at the western end of Long Beach Harbor. Head south along I-110 to where it ends and turn left onto Gaffey St. Follow Gaffey St. south, then turn left onto 27th St. and right onto Pacific Ave. At the lights, turn left onto Stephan M. White Drive (Cabrillo Beach sign) and left again onto Oliver Vickery Circle Way at the statue. Drive into the Park and follow the signs to the boat ramp, which is located in the northeastern corner. The Fishing Pier is located just to the east of the ramp and small boat basin.

**SITE DESCRIPTION** - The site is located under the eastern end of the San Pedro Harbor Fishing Pier, and can only be sampled from a small boat. Station 1 is located on the 5th set of pilings from the east end of the pier, Station 2 is on the 6th set and Station 3 is on the 9th set of pilings. Care should be taken to avoid all the fishing lines, as this is a popular weekend fishing spot.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a good population of *M. edulis* mussels on the pilings of the fishing pier. Care should be taken in sampling these mussels, as there are also a number of *M. californianus* mussels on the pilings.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment station lies just to the north of the building on the fishing pier, and south of the shipping channel, at 33° 42.66' N and 118° 16.60' W in 4 m of water. The sediments were a fine olive-brown silty mud.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0-0.25 m MLLW

**SITE** - ROYAL PALMS STATE PARK, PALOS VERDES, CA **SITE CODE** - PVRP

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 33° 43.02' N 118° 19.36' W

**Sediment site center** - 33° 42.66' N 118° 21.04' W

**LOCATED ON NOAA CHART** - 18746

**SITE ACCESS** - This site is located at Royal Palms State Park on the Palos Verdes peninsula. From Interstate 110 south in San Pedro, take the Gaffey St. exit south approximately 2.5 mi to Paseo Del Mar. Turn right (west) and proceed to the State Park entrance (approximately 1.7 mi), just before the intersection of Western Ave. Drive down the park entrance road and park near the life guard tower. The site is on a large rock outcrop directly offshore from the life guard tower, and is accessible across the beach at low tide.

**SITE DESCRIPTION** - The site center is the highest rock peak on the outcrop. Discrete collection stations were on the northwest side of the outcrop. The middle station was directly below the site center and the other two stations were 25 m inshore and offshore on the northwest side of the outcrop. This site is very exposed and would be hazardous in heavy seas. Moreover, the rock outcrop is an island at all but the lowest tides.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* occurred in large patches just above the brown algal zone. Collected organisms ranged from approximately 40–70 mm in shell length.  
1996 There is a good population of *M. californianus* mussels in the area.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.  
1996 Fine grained sediments were collected.  
1997 No collection.

#### **SAMPLING METHODS**

- Bivalves - hand  
Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - MUNICIPAL JETTY, REDONDO BEACH, CA

**SITE CODE** - RBMJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 33° 49.92' N

118° 23.57' W

**LOCATED ON NOAA CHART** - 18744

**SITE ACCESS** - The site is located on the Municipal Jetty in Redondo Beach. Follow Hwy. 1 (Pacific Coast Hwy.) into Redondo Beach, and turn west onto Topaz St. Continue down Topaz to the end, where it intersects Esplanade St., and park in the vicinity. Walk down the alley, next to 703 Esplanade St., and across the beach to the jetty next to the lifeguard station.

**SITE DESCRIPTION** - The nominal site center is on the jetty. The original stations were located on the south side, but can be moved to the north side to facilitate sampling in rough weather. The three stations are 25 m apart, with Station 1 being at the beach end of the jetty.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of *M. californianus* mussels on the rocks of the jetty. The samples were collected from the north side of the jetty. Care should be taken here, as there is also a good population of *M. edulis* mussels nearer the beach.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - SOUTH JETTY, MARINA DEL REY, CA

**SITE CODE** - MDSJ

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 33° 57.71' N

118° 27.48' W

**LOCATED ON NOAA CHART** - 18744

**SITE ACCESS** - This site is located on the south jetty at the mouth of Marina Del Rey Harbor. From Interstate 405 in Los Angeles, take the Marina Freeway (Hwy. 90) west. Turn left onto Culver Blvd. at the first signal and proceed approximately 2 mi to Pacific Ave. Turn right onto Pacific Ave. and proceed until the road ends at the pedestrian bridge spanning Ballona Creek, adjacent to 62nd Ave. Park and cross the bridge to the south jetty. A good boat ramp is located in the Marina del Rey.

**SITE DESCRIPTION** - The site center is the end of the paved path towards the west (seaward) end of the jetty. The middle discrete collection station was directly below the end of the path on the south side of the jetty. The other two stations were approximately 25 m east and west of the middle station, also on the south side of the jetty.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was abundant but fairly small at this site. *M. californianus* was also present, so care was necessary to collect only the target species. Collected organisms ranged from approximately 35–50 mm in shell length.
- 1996 There was a good population of *M. edulis* on the rocks of the breakwater. Care should be taken with the identification of the mussels, as *M. californianus* are also present in limited numbers.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The soft silty olive-brown mud sediment sample was collected from near the nominal sediment site center, in 26 m of water.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW



**SITE** - POINT DUME, POINT DUME, CA

**SITE CODE** - PDPD

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 34° 00.06' N

118° 48.53' W

**LOCATED ON NOAA CHART** - 18744

**SITE ACCESS** - This site is located on Point Dume, Malibu. From Hwy. 1 (Pacific Coast Hwy.) west of Malibu, take Westward Beach Rd. south to Zuma Beach. Proceed to the last parking area at the end of the road past the life guard station. The site is below the sheer cliff at the southeast end of the beach. There are good boat ramps in Marine del Rey (15 mi to the east) and at Oxnard (about 25 mi to the northwest). There are no facilities for launching a boat in Malibu. A boat is necessary to collect the sediment sample.

**SITE DESCRIPTION** - The site center is a 1-ft high steel pipe projecting vertically from a rock at the base of the cliff, above a pile of large boulders that extended down to the waterline. The pipe is about 10 m above the waterline. Station 2 is directly below the site center in the splash zone. The other two discrete collection stations are approximately 15 m northwest and southeast of the middle station. This is a rugged, exposed site that should be sampled with great caution. Minus tides will be required for collections made during periods of large swells.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was fairly plentiful at this site, and occurred in a range of sizes. Collected organisms ranged from approximately 40–70 mm in shell length.
- 1996 There was an extremely good population of *M. californianus* mussels at the site, growing on the rocks above and below the waterline. There are also a few *M. edulis* growing in between the other mussels, so care should be taken in identifying the samples.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The fine silty olive-brown sand sediment sample was collected from about 100 m northeast of the Red "12" Bell, in about 40 m of water.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - FRASER POINT, SANTA CRUZ ISLAND, CA

**SITE CODE** - SCFP

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 34° 03.48' N

119° 55.22' W

**LOCATED ON NOAA CHART** - 18728

**SITE ACCESS** - This site is located at the western end of Santa Cruz Island, which is about 25 mi offshore. The island is owned by The Nature Conservancy, and a sampling permit is required from them before access to the island is granted. The site is most accessible by plane. Channel Islands Aviation, in Camarillo, have access to the small dirt runway at Forney Cove, about 1/2 mile to the east of the sampling site.

**SITE DESCRIPTION** - The sampling site is located in a small cove on the northeast corner of Frazer Point, on Santa Cruz Island. There three stations are located some 25 m apart along the beach, the nominal site center being the middle Station (#2).

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a good population of *M. californianus* mussels growing on the rocks along the beach.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - SAN MIGUEL ISLAND, TYLER BIGHT, CA

**SITE CODE** - SANM

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER-** 34° 01.68' N

120° 25.16' W

**LOCATED ON NOS CHART** - 18727

**SITE ACCESS** - Transportation to the island is possible by chartered plane.

**SITE DESCRIPTION** - San Miguel Island is the westernmost of the four Santa Barbara Channel Islands. The island is part of the Santa Barbara Channel Marine Sanctuary. Two-thirds of the island is used by the U.S. Navy as a missile test center. Transportation to the island is possible by chartered plane.

The sampling site is located on the southwest side of the island at the western edge of Tyler Bight. Tyler Bight is approximately 1.5 nautical miles west of the missile-danger boundary. The site is a 30-minute hike from the air strip. The site center is the north head of the rocks on the eastern side of the beach between Tyler Bight and Judith Rock. The sampling stations are on the southern portions of these rocks.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

None.

#### **SAMPLING METHODS**

Bivalves - intertidal, hand

**WATER DEPTH** - intertidal, +1.0 m MLLW



**SITE** - POINT CONCEPTION, POINT CONCEPTION, CA

**SITE CODE** - PCPC

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 34° 26.63' N

120° 27.42' W

**LOCATED ON NOAA CHART** - 18721

**SITE ACCESS** - This site is located on private property, owned by the Bixby Ranch Company. Permission to gain access to the ranch is required beforehand. From Santa Barbara, follow Hwy. 101 west to Las Cruces (Gaviota Pass), then turn west onto Hwy. 1 towards Lompoc. Travel about 15 mi along Hwy. 1, then turn left (west) onto the Jalama Rd. Follow this winding road for some 13 mi to the Bixby Ranch gate, which is located on the left before the railroad tracks and the Jalama Beach County Park. The white gate has a large Spanish "C" on it. From the gate, follow the ranch road for about 5 mi to the first house, then turn right at the signpost and head towards Point Conception. Cross over the railroad tracks, then turn left towards Government Point and the old Union Oil Tanks. Park the vehicle and walk to the small knoll that lies to the southeast. There is a small iron pipe with a rope attached to it located at the top of the cliff. This is the only safe way down to the site. The site is actually located on Government Point, which is about 3/4 of a mile to the east-southeast of the old U.S. Coast Guard Station and Point Conception Lighthouse.

**SITE DESCRIPTION** - The nominal site center is located on a flat rock bench below the cliff, on Government Point. Station 1 is at the site center, Station 2 is some 20 m to the southeast and Station 3 is about 20 m to the northwest of Station 1. Avoid sampling within the stainless steel markers placed by other researchers on the rocks. This site can only be sampled at low tide and in calm weather, as it is very exposed to the elements.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There is a very good population of large *M. californianus* mussels growing on the rocks.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5-1.0 m MLLW

**SITE** - POINT SAN LUIS, SAN LUIS OBISPO, CA

**SITE CODE** - SLSL

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 35° 09.63' N

120° 45.35' W

**LOCATED ON NOAA CHART** - 18704

**SITE ACCESS** - From Hwy. 101, between San Luis Obispo and Pismo Beach, take the Avila Beach exit, and head west. Drive through Avila Beach and follow the road around the bay past the entrance to the Diablo Canyon Nuclear Power Plant. Proceed on to the last parking lot, near the base of the Port San Luis wharf. Park and walk west over the boulders and small sandy beaches, at the base of the cliffs, to the base of the outer breakwater. This is an approximately 30-minute walk that requires some fairly deep wading, unless there is a minus tide.

**SITE DESCRIPTION** - The site center is the concrete slab atop the large rock on the west end of the sand beach, adjacent to the landward end of the outer breakwater. Discrete collection stations were the middle and end remnants of concrete pilings, just seaward of the large rock with the concrete slab atop it. This site requires a tide of 0 m or lower to allow safe passage along the base of the cliffs. Station 1 lies at the western end of the rock, Station 2 is on the south side and Station 3 is on the east side.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was plentiful in a range of sizes. Collected organisms ranged from approximately 45–70 mm in shell length.
- 1996 There was a good population of medium to large sized *M. californianus* mussels growing on the rocks and remains of the concrete pilings.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - SAN SIMEON POINT, SAN SIMEON, CA

**SITE CODE** - SSSS

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 35° 38.08' N

121° 11.68' W

**LOCATED ON NOAA CHART** - 18700

**SITE ACCESS** - This site is located on private property, owned by the Hearst Corporation. Permission to gain access to the site can be easily obtained from the State Park officials at Hearst Castle. From Cambria, follow Hwy. 1 north past San Simeon to the William R. Hearst Memorial State Beach. Turn left into the State Park and park in the lower lot next to the beach. Cross over the small stream and walk along the beach to the far end. Take the trail up the cliff and walk along the wire fence and, as the trail indicates, proceed southwards along the dirt road/trail to where it ends on a cliff overlooking a sandy cove.

**SITE DESCRIPTION** - The nominal site center is located at the east end of the small cove. The three discrete stations are located on a rocky bench, about 10 m apart.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of small to medium sized *M. californianus* mussels growing on the rocks, about 1.5 m above MLLW.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.5 m MLLW

**SITE** - LOVERS POINT, PACIFIC GROVE, CA

**SITE CODE** - PGLP

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 36° 37.63' N

121° 54.99' W

**LOCATED ON NOAA CHART** - 18685

**SITE ACCESS** - This site is located on Lovers Point in Pacific Grove. From Hwy. 1 south near Seaside, take the Pacific Grove exit onto Del Monte Ave. After approximately 1.6 mi, angle right onto Lighthouse Ave. and go through the tunnel. Approximately 1 mi past the tunnel, turn right toward the ocean onto David Ave. Turn left onto Oceanview Boulevard and proceed to Lovers Point, approximately 1 mi. Park along the seawall in front of the restaurant, just to the west of Lovers Point Park. Walk through the park to the rocky point at its seaward end.

**SITE DESCRIPTION** - The site center is a USGS survey monument in the center of the highest rocks on the point, near a cylindrical hole in a concrete casting set in the rocks. The discrete collection stations were along a channel that runs northwest-southeast through the rocks at the shore, approximately 15 m northeast of the site center. Discrete stations were 10–15 m apart, distributed from the west end to the east end of the channel. Though exposed to large swells, the site can be easily sampled some hours on either side of low tide when the mussels become visible. The rock outcrop provides some protection and advance warning of incoming waves and the structure of the formation at the site allows easy and rapid egress to avoid incoming waves.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was plentiful, but somewhat small. Collected organisms ranged from approximately 40–60 mm in shell length.
- 1996 No collection.
- 1997 *Mytilus californianus* was plentiful, and collected at about 3 hours before low tide, just as the mussels were exposed in the notch in the rocks between the rocky point and the outlying outcrop.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - MOSS LANDING BEACH, MONTEREY BAY, CA

**SITE CODE** - MBML

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 36° 48.07' N

121° 47.38' W

**LOCATED ON NOAA CHART** - 18685

**SITE ACCESS** - This site is located on a small rock outcrop just north of the Moss Landing pier. From California Hwy. 1 in Moss Landing, just south of the Pacific Gas and Electric power plant, take Moss Landing Rd. toward the sea. Take the first right and cross the one-lane bridge. Just across the bridge, turn left and park in the parking lot. Walk over the dunes and out to the beach. Proceed to the right along the beach and under the pier.

**SITE DESCRIPTION** - The site is a rock outcrop approximately 30 m north of the pier, in front of the south end of the MBARI building. The outcrop was approximately 10 m long. The site center is on the beach approximately 10 m above the rock outcrop. Discrete collection stations were in the middle and at either end of the rock outcrop, approximately 5 m apart.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was plentiful on the rock outcrop, but *M. edulis* was also present on protected portions of the rocks at the southern end of the outcrop. Consequently, care was necessary to avoid mixing *M. edulis* into the samples. Collected organisms ranged from approximately 50–75 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was collected in the size range 25-75 mm. *Mytilus edulis* was present but not abundant, as was the gooseneck barnacle. A fraction of the mussels were opened and dying.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - ELKHORN SLOUGH, MONTEREY BAY, CA

**SITE CODE** - MBES

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 36° 48.59' N

121° 47.11' W

**LOCATED ON NOAA CHART** - 18685

**SITE ACCESS** - This site is on the Hwy. 1 bridge across Elkhorn Slough near Moss Landing. A boat is required. From Moss Landing Harbor, take a small boat toward the harbor entrance to the west. At the range markers, turn right and proceed to the Hwy. 1 bridge across the mouth of Elkhorn Slough.

**SITE DESCRIPTION** - The site center is the boat speed-limit sign posted on the seaward side of the Hwy. 1 bridge. Discrete collection stations were on the seaward bridge-support pilings in the first, second, and fourth rows of pilings, counting from the west end of the bridge.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was not present on all pilings, but was abundant on some. Collected organisms ranged from approximately 40–80 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was collected with some difficulty due to the paucity of individuals in the preferred size range.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected adjacent to the high range marker just seaward of the bridge. Mud at this location was the only mud that could be found outside of the Moss Landing Harbor.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments -boat/grab

**WATER DEPTH** - intertidal, +0.75 m MLLW

**SITE** - POINT SANTA CRUZ, MONTEREY BAY, CA

**SITE CODE** - MBSC

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 36° 57.25' N

122° 01.48' W

**LOCATED ON NOAA CHART** - 18685

**SITE ACCESS** - This site is located near Point Santa Cruz in Santa Cruz. From the Hwy. 1 - Hwy. 17 interchange near Santa Cruz, take Hwy. 1 north. Approximately 1 mi after Hwy. 1 turns right and begins following Mission St., turn left (southeast) onto Bay St. Where Bay St. ends, turn right onto West Cliff Drive and proceed to Pelton Ave. Park in the parking lot on the right, just past Pelton Ave. Climb over the fence and down the cliff to the cove just south of the surfer monument (a bronze statue) at the end of Pelton Ave. Note that along this segment of the coast, the shoreline runs approximately north-south, with the sea being east of the shore.

**SITE DESCRIPTION** - The site center is a 24-inch drain pipe that protrudes from the cliff above the cove. The middle of three discrete collection stations was on the boulders at the base of the cliff, directly below the drain. The other two discrete stations were at the opposite ends of the cove, approximately 50 m north and south of the middle station.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was plentiful, but mostly small organisms were present. Collected organisms ranged from approximately 45–70 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was plentiful and collected as in previous years.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.25 m MLLW

**SITE** - E. LANDING, S.E. FARALLON ISLANDS , CA

**SITE CODE** - FIEL

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 37° 41.77' N

122° 59.99' W

**LOCATED ON NOS CHART** - 18645

**SITE ACCESS** - Conveyance to the island is either by boat or helicopter. Arrangements must be made with the U.S Fish and Wildlife Service and the PRBO.

**SITE DESCRIPTION** - Sampling is conducted on Southeast Farallon Island, one of four islands in the Farallon Group. The Farallon Islands are a U.S. Fish and Wildlife Refuge. The U.S. Fish and Wildlife Service has a cooperative agreement with the Point Reyes Bird Observatory (PRBO). The PRBO monitors and protects the seabird and marine mammal populations of the islands. Southeast Farallon Island is located 26 nautical miles west-southwest of San Francisco.

The bivalve site is located on the east side of the island, in a cove to the south of the skiff crane. The north end of the cove is marked by a high rocky peak situated between the cove and the crane. The three discrete stations are to the east and south of the site center.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, - 0.5 m MLLW





**SITE** - EMERYVILLE, SAN FRANCISCO BAY, CA

**SITE CODE** - SFEM

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 37° 49.23' N

122° 19.80' W

**Sediment site center** - 37° 49.69' N

122° 20.32' W

**LOCATED ON NOAA CHART** - 18652

**SITE ACCESS** - This site is located under the Oakland side of the Bay Bridge. From Oakland, take Hwy. 80 towards San Francisco. Just past the toll booths on the bridge (on the Oakland side), turn right onto the CalTrans Maintenance Rd. It is best to be in the far right lane when approaching the toll booths, as the access road is only a few hundred yards past them. Park outside the gate (closed at sunset). Walk through the gate and down the road, under the bridge. On the south side of the bridge, find the small metal building at the water's edge, approximately 100 m southeast of the base of the bridge.

**SITE DESCRIPTION** - The site center is the small metal building at the water's edge. Three discrete collection stations were utilized, with each being approximately 10 m from the site center. The middle collection station was directly bayward from the building. Mussels occurred in small clumps around the sides and under the rocks making up the base of the Bay Bridge.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was common. Collected organisms ranged from 40 - 90 mm in shell length.  
1996 No collection.  
1997 *Mytilus edulis* was common. Due to construction at the bridge entrance, access to the site was found to be easier by boat, launched at the public marina on Powell St. just north of the bridge.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.  
1996 No collection.  
1997 Sediments were collected with the grab from the boat at an open bay site northwest of the base of the bridge in 3 m of water.

#### **SAMPLING METHODS**

- Bivalves - hand, boat  
Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0.0 MLLW

**SITE - SEMPLE POINT, EAST SAN PABLO BAY, CA**

**SITE CODE - SPSM**

**TARGET MATRIX - Sediments**

**SITE CENTER COORDINATES - 38° 04.20' N 122° 14.33' W**

**LOCATED ON NOS CHARTS - 18651, 18654**

**SITE ACCESS** - Semple Point is located at the California Maritime Academy, near the mouth of the Napa River, between Vallejo and Benicia, on the east side of San Pablo Bay. Travel Route 80 to the northside of the Carquinez Bridge, toward Vallejo. Beyond the bridge, turn left (west) into the California Maritime Academy. Semple Point is the southwest corner of the campus. A boat may be launched from the Vallejo Marina.

**SITE DESCRIPTION** - Sediments are collected in the vicinity of Semple Point. The sediment site center is 0.25 nautical miles east of the Navy Pier (Fl R "2"), at the mouth of the Napa River on the north side of the Carquinez Straits.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Sediments - Subtidal, grab collection.

**WATER DEPTH - 5 m MLLW**

**SITE - POINT SAN PEDRO, WEST SAN PABLO BAY, CA**

**SITE CODE - SPSP**

**TARGET MATRIX - Sediments**

**SITE CENTER COORDINATES - 38° 01.35' N**

**122° 25.53' W**

**LOCATED ON NOS CHARTS -18652, 18654**

**SITE ACCESS** - Point San Pedro is located 4 miles east of San Rafael on the western shore of San Pablo Bay. Travel Highway 101 to San Rafael and turn right (east) onto Second St. Continue on Second St. as it runs into Point San Pedro Rd. and follows the coast of the peninsula. For sediment collection, launch a vessel from the Loch Lomand Marina.

**SITE DESCRIPTION** - Sediments are collected in the vicinity of Point San Pedro. The sediment site center is approximately 2.5 nautical miles north-northeast of Point San Pedro, on the north side of the shipping lane in 5-8 m of water.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Sediments - Subtidal, grab collection.

**WATER DEPTH - 6 m MLLW**

**SITE** - SPENGER'S RESIDENCE, TOMALES BAY, CA

**SITE CODE** - TBSR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 38° 08.97' N

122° 54.24' W

**LOCATED ON NOAA CHART** - 18643

**SITE ACCESS** - This site is on the west shore of Tomales Bay, near Inverness. It is on private property. To drive to the site, take Hwy. 101 to Sir Francis Drake Boulevard, just south of San Rafael. Go west on Sir Francis Drake Boulevard, approximately 3 mi past Inverness. Turn north (right) onto Pierce Point Rd., then take the turn off to the right to the L Ranch, Cooperative Creamery. Drive over two cattle guards. Go past the creamery, and take the right fork heading east toward the bay. Continue on the private, unpaved road and turn right, heading past the water tanks and onto Mr. Spenger's property.

**SITE DESCRIPTION** - The sampling site is the rocky point on the east end of the cove that comprises Mr. Spenger's property. At the east end of the cove, find the sand-bag retaining wall. This is the site center. The three discrete collection stations were located approximately 3 m apart along the rocks at the base of the bluff east of the site center, with the first station being approximately 3 m from the site center.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* was fairly abundant. Collected organisms ranged from approximately 25-60 mm in shell length.

1996 No collection.

1997 *Mytilus edulis* was abundant and collected as in 1995.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected in approximately 7 m of water from approximately the middle of Tomales Bay directly offshore from the bivalve site. The sediment site was 0.23 nm from shore on a bearing of 076° true from the rock outcrop from which the bivalves were taken.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.25 m MLLW

**SITE** - BODEGA BAY ENTRANCE, BODEGA BAY, CA

**SITE CODE** - BBBE

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 38° 18.30' N

123° 03.96' W

**LOCATED ON NOAA CHART** - 18643

**SITE ACCESS** - The sampling site is located on the northwest side of Bodega Head on the Bodega Peninsula. From the city of Santa Rosa, take Hwy. 101 north to Hwy. 12. Take Hwy. 12 west through Sebastopol and Bodega. Turn right onto Hwy. 1 and proceed to Bodega Bay. In Bodega Bay, turn left onto West Shore Rd. and drive around the bay past the marinas. Stay on the road past Campbell Cove and up onto the upper parking lot at Bodega Head. Hike down the bluff adjacent to the lower end of the parking lot and proceed north to the large peaked rock visible from the parking lot, approximately 200 m.

**SITE DESCRIPTION** - The site center is the highest point on the large outcrop (first major promontory north of the parking lot) and is distinguished by smooth sandstone, whereas the surrounding rock is rough and jagged-edged. Mussels were collected from three discrete stations seaward of the site center, within approximately 10 m of the site center. This is an exposed site with frequent high-energy surf conditions. It should be considered a mandatory two-person site.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was abundant on the lower rocks surrounding the site center. Collected organisms ranged in size from approximately 30-80 mm in shell length.
- 1996 No collection.
- 1997 The mussels were collected from the south side of the rock outcrop, as the more seaward portions were inundated by waves.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand  
Sediments - N/A

**WATER DEPTH** - intertidal, +1.5 m MLLW



### **BIVALVE COLLECTIONS**

1995 *M. californianus* was abundant at this site. Collected organisms ranged in size from approximately 30 - 80 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was abundant in dense patches on the vertical surfaces of the intertidal between +1 and +3 m above MLW.

### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - SHELTER COVE, POINT DELGADA, CA

**SITE CODE** - PDSC

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 40° 01.35' N

124° 04.40' W

**LOCATED ON NOAA CHART** - 18620

**SITE ACCESS** - The site is located in the coastal town of Shelter Cove, 23 mi west of Garberville. Take Hwy. 101 to Redway, just north of Garberville. Turn west onto Shelter Cove Rd. At the end of Shelter Cove Rd. turn left (southeast) onto Upper Pacific Drive. Follow the road as it bends to the south past the marina and turn right (west) onto Lower Pacific Drive. Take the second left onto Coral Point Rd. Park at the end of the cul-de-sac nearest the shore. Follow the path that leads to a rocky beach/cove.

There is a concrete boat launching ramp in the cove at the bottom of a very steep hill. Launching assistance is also available from the marina. The cove provides good protection from the swell. Marina and lodging facilities as well as a small airport are both at the site.

**SITE DESCRIPTION** - This site is a large reef approximately the size of a football field, with extensive mussel beds. The site center is approximately 50 m west of the trail down to the beach from the parking area and is not defined by a specific topographic feature. Discrete collection stations were the site center, and two other stations approximately 10 m north and south of the site center.

Mussels are restricted to broad dense patches on the flat horizontal surfaces of the rocks that are about 1 to 1.5 m above the 0 MLW level. Thus, the site could be sampled at times of ebbing tide if the swell is not too great.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was very abundant. Collected organisms ranged from approximately 40-80 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was very abundant.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.75 m MLLW

**SITE - HUMBOLDT BAY JETTY, EUREKA, CA**

**SITE CODE - HMBJ**

**TARGET SPECIES - *Mytilus californianus***

**NOMINAL SITE CENTER - 40° 45.85' N**

**124° 14.25' W**

**LOCATED ON NOAA CHART - 18622**

**SITE ACCESS** - This site is on the north jetty at the mouth of Humboldt Bay near Eureka. From Hwy. 101 in Eureka, take Hwy. 255 west over the Samoa Bridge to the Samoa Peninsula. Turn left (south) at the west end of the bridge, and drive into the Coast Guard station (approximately 3 mi south of bridge). Inside the Coast Guard station, bear to the right and proceed to the gravel parking lot nearest the landward end of the north jetty. From the parking lot, walk approximately 1/2 mi to the base of the jetty. Use of a four-wheel drive vehicle allows much closer access to this site, as it is possible to drive across the sand and up onto the jetty itself. Once on the jetty, proceed with caution towards the seaward end.

**SITE DESCRIPTION** - The site center is a large boulder approximately 200 m landward from the seaward end of the jetty, on the jetty's ocean (north) side. The site center is approximately 50 m landward (northeast) of the most landward doloes (doloes are the large jack-shaped concrete structures placed around the seaward end of the jetty to reinforce the jetty's structure). The boulder that identifies the site center is the largest and farthest north of the boulders that comprise an extensive tide-pool area on the ocean side of the jetty. The middle discrete collection station was the site center and the two other discrete stations were 10 m east and west of the site center. This site is very exposed, and the jetty is frequently washed by high waves, so collections require extreme caution.

With respect to sediment collections and the use of a boat at this site, extreme caution should be exercised. This is one of the most treacherous entrances on the west coast. During ebbing tide the swell breaks in the channel, thus timing of departure and return should coincide with a flood or slack tide, and the route should be followed to take advantage of the small opening in the breaking swell on the south side of the channel. Under no circumstances should this entrance be navigated in the dark.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was abundant at this site. Collected organisms ranged in size from approximately 40-90 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was not abundant but was restricted to the vertical surfaces of the main jetty structure. None were found seaward on the loose rocks.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.5 m MLLW

**SITE** - SAMOA BRIDGE, EUREKA, CA

**SITE CODE** - EUSB

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER**- 40° 49.29' N

124° 10.28' W

**LOCATED ON NOAA CHART** - 18622

**SITE ACCESS** - This site is located on the Samoa Bridge across Humboldt Bay in Eureka. It is only accessible by boat. Launch a boat from the Eureka small boat basin ramp, at the foot of Commercial St. in Eureka. Head west across the bay towards the Samoa Peninsula. In the Samoa Channel, head north and proceed toward the third (westernmost) arch of the bridge.

**SITE DESCRIPTION** - The site center is the second bridge support west of the center of the westernmost arch of the Samoa Bridge. The center of the arch is identified by a small green navigation light hanging down from the bridge. Counting from the center of the arch towards the west, the first, second, and third bridge supports comprise the discrete collection stations.

Very large *Mytilus californianus* are present in the intertidal zone at about +0.5 to +1.5 m above low tide. These are very firmly attached. The smaller individuals are found interspersed among the larger. Due to the physical force required to remove the mussels, the sampling boat should be large enough and with high enough freeboard so that the necessary force can be applied.

The sediment site was west of the dredged channel near (essentially co-located with) the bivalve sites. Water depth was about 2 m.

#### **BIVALVE COLLECTIONS**

- 1995 Both *M. californianus* and *M. edulis* were present at this site, although neither species was abundant. Each bridge support had clumps of mussels situated at and below MLLW. These clumps were composed of approximately 10-100 very large (80-220 mm in shell length) *M. californianus*, and, interspersed among the large *M. californianus*, were small groups (1-5 individuals, 30-80 mm in shell length) of *M. edulis*. Both species were collected.
- 1996 No collection.
- 1997 *Mytilus californianus* was the only species found at the site. Smaller specimens were selected for collection from three bridge pilings. Abundance of the smaller individuals was low.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Collected by grab in 2 m of water outside the dredged channel and west of the bridge pilings.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - Stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.25 m MLLW

**SITE** - FLINT ROCK HEAD, KLAMATH RIVER, CA

**SITE CODE** - KRFR

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 41° 31.63' N

124° 04.78' W

**LOCATED ON NOS CHART** - 18600

**SITE ACCESS** - Travel to Klamath via Highway 101. Just before the south end of the Klamath River Bridge, turn left (west) onto the light-duty paved road. Continue west and northwest along the Klamath River. Near the mouth of the river, the road rises and turns south. Park near the red house adjacent to the locked gate, above Dad's Fishing Camp.

**SITE DESCRIPTION** - The site is located in the Redwoods National Forest south of Crescent City and north of Eureka. The sampling location is adjacent to Flint Rock, a solitary 175-foot-high rock 2 miles south of the mouth of the Klamath River. Hike down the road to the south end of Dad's Camp. Walk south along the beach to Flint Rock. The sampling site is on the south side of Flint Rock, which is actually two large rocks. The site center is the eastern point of the northernmost rock. Discrete mussel stations are separate clusters on different sides of the rocks.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - intertidal, hand collection

Sediments - Stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, -1.5 MLLW

**SITE** - POINT SAINT GEORGE, CRESCENT CITY, CA

**SITE CODE** - SGSG

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 41° 44.87' N

124° 12.46' W

**LOCATED ON NOAA CHART** - 18603

**SITE ACCESS** - This site is located 3 nautical miles south of Point Saint George, and 0.25 nautical miles north of Battery Point near Crescent City. From Hwy. 101 in Crescent City, turn west onto Fifth St. Take Fifth St. to where it ends at the intersection of Taylor St. and park. Walk down the stairway to the beach. From the foot of the stairs, walk approximately 250 m at a heading of 200° to the large peaked rock.

**SITE DESCRIPTION** - The site center is the south side of the large peaked rock. Collections were made from three discrete collection stations, with the middle station being at the site center, and the other two stations being approximately 10 m east and west of the middle station. This is a very exposed site that is frequently hit by large waves. Extreme caution should be exercised when collecting here.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was abundant at this site. Collected organisms ranged from approximately 30-80 mm in shell length.

1996 No collection.

1997 *Mytilus californianus* was abundant when found, but not ubiquitous to all rocks. Individuals were most abundant in the inter-tidal zone, from +1 to +3 m above the MLW. Specimens this year were not differentiated into stations, and were collected in the zone +1-2 m MLW.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +1.75 m MLLW

## OREGON SITES

**SITE** - COOS HEAD, COOS BAY, OR

**SITE CODE** - CBCH

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 43° 21.00' N

124° 19.85' W

**LOCATED ON NOAA CHART** - 18587

**SITE ACCESS** - The site is located on the jetty at the Oregon Institute of Marine Biology, which used to be the old Coos Head Coast Guard Station. From Hwy. 101 in Coos Bay, turn west onto Newmark Rd. and drive to the end. Then go south (left) onto South Empire Rd. and follow the road for about 4.5 mi down to Charlestown. Cross over the bridge into the town and take the first right onto Boat Basin Rd. Follow the road to the end and then into the old Coast Guard Station grounds. The Institute Administration building is on the left hand side of the road before the old USCG station. Permission should be obtained from the laboratory director for access to the site, which is now on the Institute's grounds. If sediments are to be collected, a boat is needed to access the sediment site. There is a good public boat ramp at North Bend, next to the Municipal Airport.

**SITE DESCRIPTION** - The bivalve site is located on the jetty at the Oregon Institute of Marine Biology, which used to be the old Coos Head Coast Guard Station. The discrete stations are located on the concrete pilings under the jetty.

### BIVALVE COLLECTIONS

1995 No collection.

1996 The site was sampled under adverse weather conditions, just after a 100 year winter storm. Discrete sampling stations were not collected, as the waves and wind conditions were very high, and there was only a few mussels to be found higher up the intertidal zone. Medium sized *M. californianus* mussels were collected for the analysis.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 The gray-brown silty sand contained some shell hash. The sediment sample was collected about 50 m to the west of the black/orange "B" range marker, on the west side of the channel, at 43° 22.19' N and 124° 18.80' W in about 2 m of water. The sediment sample was collected February 26th, 1996, as there was a severe 100 year storm in December that prevented the sample from being collected.

1997 No collection.

### SAMPLING METHODS

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - RUSSELL POINT, COOS BAY, OR

**SITE CODE** - CBRP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 43° 25.88' N

124° 13.27' W

**LOCATED ON NOAA CHART** - 18587

**SITE ACCESS** - This site is located under the Hwy. 101 bridge across Coos Bay, just to the north of North Bend. Access is via private property. To reach the site, turn east onto East Bay Drive, just north of the Hwy. 101 bridge over Coos Bay (connecting Russell Point to North Point). On East Bay Drive, turn right onto the first private driveway. If sediments are to be collected, a boat is needed to access the sediment site. There is a good public boat ramp at North Bend, to the northeast of the Municipal Airport. Access to the ramp is via California St. Follow the sign to the ramp. It is also easier to sample the bivalve site from a small boat.

**SITE DESCRIPTION** - At this site, mussels were found in a single small patch, hanging upside down from the bottom of the center section of the 6th bridge support, counting from the north end of the bridge (approximately 150 m south of the north end of the bridge). No farther than the 7th bridge support was accessible without a boat, and mussels were not present on the 7th support. Consequently, collections were pooled from the 6th support, without designating three discrete collection stations. The target location (i.e., the 8th, 9th, and 10th bridge supports) was not accessible without a boat.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was collected from this site, although it was uncommon. Oysters (*Crassostrea gigas*) were also present, but uncommon.
- 1996 During the 1996 field season, there was a small population of small *M. edulis* mussels growing on the concrete bridge pilings, and on the rocks around the bases of the pilings. The discrete stations were located on the 1st, 2nd and 3rd pilings north of the green mid-section of the bridge.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The sediment sample was collected from just off the second bridge piling (Station 2), in about 2 m of water.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - ONEATTA POINT, YAQUINA BAY, OR

**SITE CODE** - YBOP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 44° 34.51' N

123° 59.34' W

**LOCATED ON NOAA CHART** - 18581

**SITE ACCESS** - Mussels from this site are acquired from the Oregon Oyster Company, Inc., 6878 Yaquina Bay Rd., located on the north side of Yaquina Bay, approximately 7 mi east of Newport. Turn east from Hwy. 101 onto Yaquina Bay Rd. at the southern end of Newport, just north of the Hwy. 101 bridge over Yaquina Bay.

**SITE DESCRIPTION** - Mussels occur at this site through natural settlement onto commercially grown oysters. The oysters are cultured in mesh bags placed in floating wooden racks, which means that these mussels are never exposed to the atmosphere at low tide. The mussels are discarded into large bins along with empty oyster shells as the oysters are harvested and processed. Collections were made from mussels that had been removed from the water within a few hours.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* was abundant. Cultured *Crassostrea gigas* and *Ostrea lurida* were also abundant at this site.

1996 No collection.

1997 *Mytilus edulis* was abundant.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 The site is approximately 1 mi west and slightly north of the oyster farm. The site is on the west bank of the river near the entrance of a Pool's Slough or small tributary of the river (44° 34.81' N, 124° 00.66' W)

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - Not applicable, see site description.

**SITE** - YAQUINA HEAD, YAQUINA BAY, OR

**SITE CODE** - YHYH

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 44° 40.58' N

124° 04.68' W

**LOCATED ON NOS CHART** - 18561

**SITE ACCESS** - For site access, turn off Highway 101 approximately 5 miles north of Newport at the sign to Yaquina Head. Park in the lot and go down the staircase to the beach directly below the lighthouse. Beware of high winds, surf and surging tide.

**SITE DESCRIPTION** - Mussels are found on rocks south of the tip of Yaquina Head. For sediment collection, launch at Rivers Bend Marina. Travel downriver to Sally's Slough and sample near the entrance to the north of the dredged channel.

This site is no longer sampled because it was categorized in 1992 as a Marine Garden by the Oregon Department of Fish and Game.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - Intertidal, hand collection

Sediments - N/A

**WATER DEPTH** - 2.5 m

**SITE - SALLY'S SLOUGH, YAQUINA BAY, OR**

**SITE CODE - YHSS**

**TARGET MATRIX - sediment**

**NOMINAL SITE CENTER - 44° 36.83' N**

**124° 00.95' W**

**LOCATED ON NOS CHART - 18581**

**SITE ACCESS** - Access is via a road that follows the Yaquina River on the north shore to River's Bend Marina near Sally's Slough and Oneatta Point. A boat launching sling is available year-round at River's Bend Marina. From the marina, proceed downriver approximately 1.75 nautical miles to Sally's Slough.

**SITE DESCRIPTION** - This is the sediment collection site for YHYH (previous listing). This site is located about 5 miles from the city of Newport, Oregon. From the marina, proceed down river approximately 1.75 nm to Sally's Slough. Sampling must occur on an incoming high tide due to the shallowness of the bay.

**SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Fine grained sediments collected.

**SAMPLING METHODS**

Bivalves - N/A

Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH - 2.5 m**

**SITE** - FOGARTY CREEK, YAQUINA BAY, OR

**SITE CODE** - YHFC

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 44° 50.22' N

124° 03.12' W

**LOCATED ON NOAA CHART** - 18561

**SITE ACCESS** - This site has replaced the original site at Yaquina Head (YHYH). This site (YHFC) is located adjacent to the mouth of Fogarty Creek near Yaquina Head. It is an open-coast site, not actually on Yaquina Bay as the name suggests. Fogarty Creek empties into the ocean approximately 2 mi north of the town of Depoe Bay, which is approximately 20 mi north of Newport. Take Hwy. 101 to the Fogarty Creek State Park parking lot located on the east side of Hwy. 101. From the parking lot, follow the signs to the beach. The trail to the beach runs along the south side of Fogarty Creek, and crosses under the Hwy. 101 bridge over the creek. From the trail under the southwest corner of the bridge, the site is approximately 300 m west-southwest.

**SITE DESCRIPTION** - The site center is a large tide pool on the west side of a large group of rocks located at the water's edge just south of where Fogarty Creek runs into the ocean (this may change over time). Collections were made from three discrete stations. The middle station was at the site center and two other discrete stations were located approximately 10 m north and south of the middle station. The previously used coordinates suggested that the site was several hundred meters northwest (underwater) from where collections were made. The site center reported here was on the closest mussel-bearing rocks to the previous coordinates.

In 1997, mussels were found only on the large rock formation (seawardmost from the shore). Due to the severe wave energy and the fact that mussels were located only at the low water mark and below, discrete stations were not possible. Mussels were collected on the northeast side of the formation at the low water mark. Mussels were plentiful and large (*M. californianus*), with much barnacle encrustation.

#### **BIVALVE COLLECTIONS**

- 1995 *M. californianus* was abundant. Collected organisms ranged from approximately 40-70 mm in shell length. This site is very exposed and is hazardous during heavy surf conditions.
- 1996 No collection.
- 1997 *Mytilus californianus* was abundant at this site. Collected organisms were cut from the vertical rock surfaces during low water intervals between wave sets. This site is very exposed and is hazardous during heavy surf conditions. Collections must be made at low tide.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 The site is actually in Yaquina Bay in an area known locally as Sally's Bend (see site for YHSS).

#### **SAMPLING METHODS**

Bivalves - hand

**WATER DEPTH** - intertidal, +1.5 m MLLW

**SITE** - HOBSONVILLE POINT, TILLAMOOK BAY, OR

**SITE CODE** - TBHP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 45° 32.83' N

123° 54.45' W

**LOCATED ON NOAA CHART** - 18558

**SITE ACCESS** - This site is located a few hundred meters southwest of the Hobsonville Point Historic Marker, which is approximately 4 mi south of the town of Garibaldi, Oregon, adjacent to Hwy. 101. Park in the gravel lot on the west side of Hwy. 101, in view of the "Point of Historic Interest" marker. Take the trail southwest approximately 200 m to the southwest tip of Hobsonville Point.

**SITE DESCRIPTION** - The site center is the southwest tip of Hobsonville Point. Because the mussels were sparse at this site, discrete collection stations were not designated. Mussels were collected from concrete boulders located within approximately 15 m of the site center.

In 1997, mussels (*Mytilus edulis*) were collected on the first two large-sized concrete blocks most seaward at the site center. The trail entrance to the beach site is located approximately 15 ft. to the left of the Hobsonville Point historic marker. Samples should be collected at low tide as water line marks near the site indicate both of the sampled boulders are sub-aerial during higher tidal periods. Wave energy is very low at the site area with minimal risk to the collectors during low tides.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was somewhat sparse. Collected organisms ranged from 30-40 mm in shell length, and were heavily fouled by barnacles.
- 1996 No collection.
- 1997 *Mytilus edulis* were quite abundant at Hobsonville Point. Specimens were rather small with average shell lengths between 20 - 40 cm. Most of the organisms were thickly encrusted with barnacles.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected by boat and grab from a site approximately 1 mi south of the point and across the bay in the tidal flats near the southern end of the seawall/breakwater that forms the western boundary of the bay. The boat was launched at the Garibaldi Marina at the end of 7th St., and the channel is followed south to the sampling site. Areas outside the channel are extremely shallow, except at high tide when a direct route is possible.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

sediments - 3-4 m at high tide, less than 1 meter at low tide

**SITE** - SOUTH JETTY, COLUMBIA RIVER MOUTH, OR

**SITE CODE** - CRSJ

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 46° 13.72' N

124° 01.39' W

**LOCATED ON NOAA CHART** - 18521

**SITE ACCESS** - This site is located on the south jetty at the mouth of the Columbia River. From Astoria, drive south on Highway 101 across Youngs Bay. Near the south side of Youngs Bay, take the Warrenton-Astoria Highway west. From the Warrenton-Astoria Highway, take the Fort Stevens Highway north to Fort Stevens State Park and follow the signs to parking lot C. Park the car in the southwest corner of the lot and take the trail beginning at that corner across the cordgrass to the sandflats on the north side of the jetty. The site is about 1/2 mi out the jetty, past where the cordgrass stops and the sand flats intersect the jetty. The sand flats are exposed for a considerable expanse at low tide, and it is only possible to collect mussels during this low tide exposure, as the mussels are limited to a very narrow horizon at the sand/jetty interface. It is easy and safe to collect at night if the tide is out.

Precautions - The entrance to the Columbia River is one of the most dangerous harbor entrances in the world due to high swells, high tidal and river flow, and bars which create an extraordinary environment of breaking waves across the entrance. The extreme energy of the environment is witnessed by the number of very large logs/driftwood that are perched atop the jetty some 20-30 feet above the sea surface, having been thrown there by the surf. Extreme caution should be used in sampling this site as large waves frequently crash over the jetty and onto the river side. Care also should be taken when approaching the site because there are areas of very soft sand which are exposed at low tide. The rock rubble of the jetty is not amenable to climbing and there is no walkway or path on top of the jetty. Access to the site is only possible by walking the sand flats on the north side of the jetty at low (or receding) tide.

**SITE DESCRIPTION** - The site center is approximately where the sand flats abutting the jetty at low tide end and the bay precludes further advance out the jetty. The mussels are found in very dense mats of small individuals. The patches are not ubiquitous but can be easily found in the crevices between rocks at the sand/rock interface. Distinct site designation is not possible.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* occurred in extensive mats covering large surfaces of the jetty's base rocks, although they were small. Collected organisms ranged from approximately 10 - 20 mm in shell length.
- 1996 No collection.
- 1997 *Mytilus edulis* were collected at the seaward end of the sand flat on the north side of the jetty at low tide. Individuals were small, and no large individuals were in evidence anywhere near the site.

#### **SEDIMENT COLLECTIONS**

N/A

#### **SAMPLING METHODS**

Bivalves - hand

**WATER DEPTH** - intertidal, 0.0 MLLW

**SITE - COLUMBIA RIVER, YOUNGS BAY, OR**

**SITE CODE - CRYB**

**TARGET MATRIX - sediment**

**NOMINAL SITE CENTER - 46° 10.98' N**

**123° 52.79' W**

**LOCATED ON NOS CHART - 18521**

**SITE ACCESS** - The boat can be launched at Warrenton Marina on the Skipanon River. The launch ramp is at the East Harbor St. bridge crossing the river.

**SITE DESCRIPTION** - The sediment site is in Young's Bay. The site center is near Channel Marker #2-fluorescent orange, approximately one-half mile west of Young's Bay Bridge.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 Sediments were collected adjacent to channel marker #2 on the river side of the entrance to Youngs Bay. The exact location was revisited as well as several locations at different depths in the vicinity, but all sediments were predominantly sand. The designated location was sampled in a water depth of about 4 m.

#### **SAMPLING METHODS**

Bivalves - N/A

Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH - 4 m**

## WASHINGTON SITES

**SITE** - COLUMBIA RIVER, NORTH JETTY, WA

**SITE CODE** - CRNJ

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 46° 16.67' N

124° 03.73' W

**Sediments** - 46° 16.15' N      123° 59.92' W

**LOCATED ON NOS CHART** - 18521

**SITE ACCESS** - Access is at the end of the road in Fort Canby State Park.

**SITE DESCRIPTION** - Mussels are collected on the rocks forming the north jetty located in the Fort Canby State Park camping area.

This sediment site is located in Baker's Bay on the north side of the Columbia River mouth. Access is by boat from the boat basin in Ilwaco. A sling launch is available year-round at the Port of Ilwaco facilities. From the boat basin, take the navigation channel south and enter the river mouth proper. Enter Baker's Bay from the south tip of Sand Island and locate the tower just inside the mouth of Baker's Bay. Note that entry to Baker's Bay must be made on a high and flooding tide due to the shallowness of the bay.

### BIVALVE COLLECTIONS

1995 No collection.

1996 No collection.

1997 No collection.

### SEDIMENT COLLECTIONS

N/A

### SAMPLING METHODS

Bivalves - Intertidal, hand

Sediments - stainless steel grab and stainless steel scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW  
sediments, 2.5 m

**SITE** - NAHCOTTA, WILLAPA BAY, WA

**SITE CODE** - WBNA

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 46° 29.95' N

124° 01.63' W

**LOCATED ON NOAA CHART** - 18504

**SITE ACCESS** - Follow Hwy. 101 out to the North Beach peninsula, and drive into Seaview. Take Hwy. 103 north to Oceanside. At the 4-way stop/red light in Oceanside, turn right onto Bay Ave. Bay Ave. intersects Sandridge at a stop sign, turn left and drive north 0.6 mi to 273rd St. Turn right and drive down to the breakwater and the Jolly Roger Seafood Plant. There is a small boat basin here, along with a boat ramp.

**SITE DESCRIPTION** - The site is located just to the south of the breakwater, on the oyster farming racks owned by the State of Washington Oyster Laboratory in Nahcotta. The surrounding area is a large intertidal mud flat.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection because no mussels (*M. edulis*) were found. Nahcotta is an important commercial oyster farming area, where the Giant Pacific Oyster, *Ostrea gigas*, is cultivated and grown. The entire shoreline is littered with dead oyster shells, and the area has a dense growth of live oysters.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected from the nominal site center, and was comprised of soft light brown silty sands.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held stainless steel scoop

**WATER DEPTH** - intertidal, 0 m MLLW

**SITE** - WESTPORT JETTY, GRAY'S HARBOR, WA

**SITE CODE** - GHWJ

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 46° 54.58' N

124° 07.06' W

**LOCATED ON NOAA CHART** - 18502

**SITE ACCESS** - This site is located on the seawall at the base of the jetty in Westport, on Gray's Harbor. Take Hwy. 105 into Westport, turn right onto Dock Ave. and then left onto Westhaven Drive at the stop sign. Locate the tall blue and white observation tower next to the Islander Restaurant/Motel. The collection site is on the seawall, just to the north of the observation tower.

**SITE DESCRIPTION** - The site center is on the bayward side of the seawall, north-northeast of the observation tower. Mussels were collected from the nominal site center and two other discrete stations separated by 15 m on either side of the site center.

#### **BIVALVE COLLECTIONS**

1995 *M. californianus* was abundant. Collected organisms ranged from approximately 40-80 mm in shell length.

1996 There was a good population of small to medium sized *M. californianus* mussels throughout the area. The mussels were generally located on the protected underside of the rocks, on the breakwater/seawall.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - CAPE FLATTERY, STRAIT OF JUAN DE FUCA, WA **SITE CODE** - JFCF

**TARGET SPECIES** - *Mytilus californianus*

**NOMINAL SITE CENTER** - 48° 22.95' N 124° 43.68' W

**LOCATED ON NOAA CHART** - 18485

**SITE ACCESS** - This site is remote and should only be attempted with the aid of a local Makah Indian Guide. The Fisheries Office is located on the right, just before the U.S. Coast Guard Station, as one enters Neah Bay. To access the site, follow the signs from Neah Bay to Cape Flattery. Drive past the old Makah Air Force Station, now the Makah Indian Reservation Tribal Council Offices, and out to the parking area next to the remote Coast Guard Radar Station. Access from here is via narrow footpaths and game trails. A 200' length of 1/2" rope is necessary to descend the cliff above the site. Hwy. 112 west from Port Angeles via Sekiu is often subject to closure during the winter months, as a result of heavy snowfall and/or rock/mud slides.

**SITE DESCRIPTION** - The site lies just to the north of Hole in the Wall Cove. This is an extremely high surf area, and sampling should only be undertaken at minus tides on calm days. This site should not be attempted at night, or in wet weather - as the path is very slippery and dangerously close to the edge of the cliff. The three discrete stations are located 250 to 25 m apart, around the nominal site center.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a very good population of *M. californianus* mussels at the site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

None, the sediment site is at Neah Bay (JFNB).

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - N/A

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - NEAH BAY, STRAIT OF JUAN DE FUCA, WA

**SITE CODE** - JFNB

**TARGET MATRIX** - Sediments

**NOMINAL SITE CENTER** - 48° 22.46' N

124° 36.96' W

**LOCATED ON NOAA CHART** - 18484

**SITE ACCESS** - This sediment site can only be accessed by boat. Follow Hwy. 101 west from Port Angeles to Sappho, then turn north onto Hwy. 113 and drive towards Sekiu. When the road intersects Hwy. 112, continue on towards Sekiu and Neah Bay. There is a good boat ramp in Neah Bay, the Big Salmon Ramp. Contact should be made beforehand with the Makah Indian Reservation Fisheries Office.

**SITE DESCRIPTION** - The sediment site is located on the north side of Neah Bay, just inside the outer rock breakwater and to the east of the log boom area.

#### **BIVALVE COLLECTIONS**

None, the bivalve site is at Cape Flattery (JFCF).

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected from the nominal site center, in 8 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - N/A

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, -8.0 m MLLW

**SITE** - PORT ANGELES, PUGET SOUND, WA

**SITE CODE** - PSPA

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 48° 08.38' N

123° 25.21' W

**LOCATED ON NOAA CHART** - 18468

**SITE ACCESS** - The sampling site is located at the Stolts'seafarm salmon pens in Port Angeles Harbor, and can only be accessed by boat. Permission is required to sample at the salmon pens. Follow Hwy. 101 north out to the Olympic Peninsula, through Sequim and on to Port Angeles. Follow the signs out to Ediz Hook, where there is a good boat ramp just short of the U.S. Coast Guard Station entrance and the Pilot Station.

**SITE DESCRIPTION** - The Salmon pens are located just to the southeast of the boat ramp, and west of the Coast Guard Station on the Point of Ediz Hook. The discrete sampling stations are located 20 to 25 m apart, around the nominal site center.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of small to medium sized *M. edulis* mussels growing on the floats and buoys around the salmon pens. The mussels were all subtidal, as the salmon pens float on the surface of the water.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected from an area to the southeast of the salmon pens, at 48° 06.18' N and 122° 45.90' W.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - subtidal, 0-0.5 m MLLW

**SITE** - PORT TOWNSEND, PUGET SOUND, WA

**SITE CODE** - PSPT

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 48° 06.28' N

122° 46.68' W

**LOCATED ON NOAA CHART** - 18464

**SITE ACCESS** - This sampling site is an easy walk-up from the shore. Follow Hwy. 101 north out to the Olympic Peninsula, and then turn right (east) on Hwy. 20 and drive to Port Townsend. A boat is necessary if sediments are to be collected. There is a good small boat ramp at the Port Townsend Marina - right next to the bivalve site.

**SITE DESCRIPTION** - The site is located at the southwest corner of the Port Townsend Marina breakwater, next to the abandoned railroad ferry terminal. Station 1 is located at the nominal site center, the southwest corner of the rock breakwater, Station 2 is 10 m to the northwest and Station 3 is a further 30 m along the northwest breakwater.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a small population of small *M. edulis* mussels growing in between and under the rocks on the marina breakwater. There were lots of barnacles and also a few small Olympia Oysters.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected just off the nominal site center, in about 20 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - HOOD CANAL, PUGET SOUND, WA

**SITE CODE** - PSHC

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 49.91' N

122° 41.30' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - The bivalve site is located at the abandoned Southpoint Ferry Terminal in Bridgehaven, just to the southwest of the Hood Canal Floating Bridge. From Hwy. 104 several miles west of the Hood Canal Floating Bridge, turn south onto Southpoint Rd., which runs between Hwy. 104 and the abandoned ferry terminal. Proceed to the end of Southpoint Rd. Park near the pilings of the abandoned ferry terminal. A boat is necessary if sediments are to be collected. There is a good ramp under the west end of the Hood Canal Floating Bridge, on the north side at Termination Point. There is a second ramp on the east side of the bridge, near Salisbury Point.

**SITE DESCRIPTION** - The site center is the northeast corner of the parking lot at the abandoned ferry terminal. The only observed mussel habitat was the pilings of the abandoned ferry terminal, approximately 25 m north of the site center. This is a rather small site, so discrete collection stations were not designated.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was rare and in fact, the majority of the collected mussels were growing on a rope hanging down amongst the pilings. Collected organisms ranged in size from approximately 20-50 mm in shell length. There were many sea stars (*Pycnopodia* sp.) present during the collection, indicating that predation may account for the rarity of mussels at this site.
- 1996 There was a fairly good population of small to medium sized *M. edulis* mussels growing on the creosote pilings of the old ferry dock. These were the only mussels to be found in the area, and they were all located some 2 to 2.5 m above MLLW in a narrow dense band on the pilings. Unfortunately, there was no alternative location that was a natural substrate on which mussels could be found.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 The soft olive-brown silty sediment sample was collected from 47° 50.31' N and 122° 38.92' W, in about 65 m of water.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +2.5 m MLLW

**SITE** - BUDD INLET, SOUTH PUGET SOUND, WA

**SITE CODE** - SSBI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 05.96' N

122° 53.65' W

**LOCATED ON NOAA CHART** - 18456

**SITE ACCESS** - This site is located adjacent to the abandoned Washington State Department of Natural Resources Marine Research and Development Center Laboratory, near Olympia. From downtown Olympia, drive north on East Bay Drive, which turns into Boston Harbor Rd. From Boston Harbor Rd., turn left onto 47th Ave. SW and proceed to the Washington State Department of Natural Resources Marine Research and Development Center Laboratory (WSDNR). This facility has been abandoned because of leaking fuel storage tanks, so permission is required to access this site across State property. Alternatively, the site can be accessed through a trailer park just north of the laboratory property. The trailer park information is as follows: Sea Shore Villa Trailer Park, 4805 Cushman Rd., Olympia, WA. From 47th Ave. SW, which is located just after the Lutheran Church on the right hand side of Boston Harbor Rd., turn right on Cushman Rd. and proceed to the trailer park. Find the road to the beach on the left (south) side of the trailer park, and drive down to the beach. A small boat is necessary if sediments are to be collected. There is a good boat ramp at the East Bay Marina, just off Marina Access Rd.

**SITE DESCRIPTION** - The site center is the landward end of the marine laboratory pier. The three discrete collection stations were as follows: 1) the rip-rap at the base of the pier, 2) the first pair of pilings from shore, and 3) a set of unattached pilings 10 m north of the pier.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* was abundant. Collected organisms ranged from approximately 35-65 mm in shell length. Oysters (*Crassostrea gigas*), and clams (Tapes, Saxidomus, etc.) were also abundant at this site.

1996 There was a fair population of small to medium sized *M. edulis* mussels at the site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The soft olive-brown silty sediment sample contained some shell, and was collected from 47° 06.04' N and 122° 54.74' W in about 25 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW



**SITE** - BROWNS POINT, COMMENCEMENT BAY, WA

**SITE CODE** - CBBP

**TARGET MATRIX** - Sediments

**NOMINAL SITE CENTER** - 47° 17.59' N

122° 25.99' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - This site is only accessible by boat, as it is located southeast of Browns Point in Commencement Bay. From U.S. Hwy. 5, take Exit 137 north onto 54th Ave East. This road goes into Taylor way and then intersects East 11th St. (Hwy. 509). Turn right onto E. 11th St. and cross over the Hylebos Creek Waterway. Then turn left on Marine View Drive (continuation of Hwy. 509) and continue on for about 1/2 a mile to Ole & Charlie's Marina which is on the left.

**SITE DESCRIPTION** - The sampling site is located about 1 mi to the northwest of the marina, just to the south of the barge storage area and west of the log booming ground.

#### **BIVALVE COLLECTIONS**

None, the bivalve site is at Tahlequah Point (CBTP).

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected in about 58 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - N/A

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, -58.0 m MLLW

**SITE** - SOUTH SEATTLE, PUGET SOUND, WA

**SITE CODE** - PSSS

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 31.40' N

122° 23.62' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - The original sampling site is located at Point Williams, in Lincoln Park. From U.S. Hwy. 5, take Exit 163 west onto the West Seattle Freeway which goes into Fauntleroy Ave. Proceed south down Fauntleroy Ave. for about 3.5 mi to Lincoln Park, which will be on the right/west (Puget Sound) side of the road. Park the vehicle in the parking lot, and walk approximately 300 m through the park to the point. A boat is necessary if sediment samples are to be collected. There is a good boat ramp (the Armeni Boat Ramp) approximately 5 mi to the north at Duwamish Head.

**SITE DESCRIPTION** - The original site was located on the large cobble rocks at Point Williams.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 The original site at Point Williams was extensively searched and no live *M. edulis* mussels were discovered in the immediate area. The only live mussels found were growing on the pilings at the Fauntleroy Ferry dock, about 1/2 a mile to the southeast along the beach. Discrete sampling stations were not possible, as the population was small, sparse and in a limited area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The gray-brown silty sand sediment sample contained some shell hash, and was collected from 47° 31.47' N and 122° 24.16' W, in about 41 m of water. The sediment site was moved from the original site (47° 31.55' N and 122° 25.08' W), as the sediments were unacceptable and contained only rocks, gravels and sands.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - WATERMAN POINT, SINCLAIR INLET, WA

**SITE CODE** - SIWP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 35.11' N

122° 34.25' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - This site is a walk-up and is easily accessible. From U.S. Hwy. 5 in Tacoma, take Hwy. 16 north towards Bremerton, then turn right onto Hwy. 160 and proceed into Port Orchard. At the intersection of Hwy. 166, turn left and go north, then turn right onto Beach Drive. This road runs parallel to the east side of Sinclair Inlet. Turn left onto Lighthouse Rd. and park at the end. Access to the site is through private property. A small boat is needed if sediment samples are to be collected. There are two good boat ramps located to the south in Port Orchard.

**SITE DESCRIPTION** - The sampling site is located at the Waterman Point Light, in Sinclair Inlet. The discrete stations are located about 25 m apart, on the rocks around the base of the light.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of small to medium sized *M. edulis* mussels growing in crevices and under the rocks around the navigational light. All of the mussels were heavily encrusted with marine growth and barnacles, that may have provided some additional protection from the numerous large starfish in the area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected near the "L2" barge mooring, at 47° 33.04' N and 122° 37.61' W in about 12 m of water. The "L3" mooring had been removed prior to sampling the site.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - DUWAMISH HEAD, ELLIOTT BAY, WA

**SITE CODE** - EBDH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 35.75' N

122° 23.30' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - This site is a walk-up, and is easily accessible. From U.S. Hwy. 5 in Seattle, take Exit 163 west onto the West Seattle Freeway. Then take the exit north onto Harbor Ave. SW and continue on to Duwamish Head. A small boat is needed if sediment samples are to be collected. There is a good public boat at Armeni Park.

**SITE DESCRIPTION** - The site is located just to the southeast of Duwamish Head, on Harbor Ave. SW at the "Anchor Park". The three discrete stations are located on the east, north and west sides of the stone seawall that form the three sides to the park.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of small *M. edulis* mussels growing on the rock seawall, below the "Anchor Park." The mussels were all encrusted with barnacles.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected near the nominal site center, about 0.5 mi to the north of the bivalve site in Elliott Bay, in about 100 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +1.5 m MLLW

**SITE** - FOUR-MILE ROCK, ELLIOTT BAY, WA

**SITE CODE** - EBFRR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 38.33' N

122° 24.83' W

**LOCATED ON NOAA CHART** - 18445

**SITE ACCESS** - This is a walk-up site that is easily accessible at low tide. Take Exit 166 on U.S. Hwy. 5 in Seattle, and head west down Denny Way. At the end of Denny Way, turn right (north) onto Western Ave. which goes into Elliott Ave. West. Continue on and take the right exit onto West Garfield St. and go over the bridge and up the hill onto Magnolia Blvd. At the stop sign, turn left onto W. Howe St. and cross the bridge, and turn left again onto the continuation of Magnolia Blvd. Turn left again onto W. Raye St. and drive down the hill to the bottom. Take a left on Perkins Lane. Look for a 6' high yellow picket fence on the right, that spans the width of two properties with no buildings. This land is owned by the City Council, and lies directly above Four-Mile Rock. A small boat is necessary if sediments are to be sampled. There is a good small boat ramp at Duwamish Head, a few miles away to the south across Elliott Bay.

**SITE DESCRIPTION** - The site is located at Four-Mile Rock, a five meter high boulder lying just offshore and below Magnolia Bluff. The rock has a green navigation marker/light built on top of it. The discrete stations are located around the rock. Station 1 lies to the northeast on the pebble beach, Station 2 lies to the northwest and Station 3 lies to the southeast.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a very sparse population of small to medium sized *M. edulis* mussels growing on Four-Mile Rock and the surrounding pebble beach area. All of the mussels were heavily encrusted with marine growth and barnacles.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected near the nominal site center, at 47° 37.68' N and 122° 24.33' W in about 45 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

**SITE** - POSSESSION POINT, WHIDBEY ISLAND, WA

**SITE CODE** - WIPP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 54.32' N

122° 22.62' W

**LOCATED ON NOAA CHART** - 18473

**SITE ACCESS** - This site is on the east side of Possession Point, at the south end of Whidbey Island. It is most easily accessed via private property, and prior permission must be obtained for collections. Take the ferry from Mukilteo to Clinton. Exit the ferry terminal and turn left at the first intersection onto Humphrey Rd. Proceed south to Glendale Rd., then turn left onto Jewett Rd., which turns into Possession Point Rd. From Possession Point Rd., turn right onto South Franklin Rd. and proceed to the end of the road. At the end of the road, access is gained to the shore across private property. The site is the cobble beach just to the south of the private residence.

**SITE DESCRIPTION** - The site center is on the beach approximately 150 m south of the retaining wall between the private property and top of the beach. Discrete collection stations were not established because mussels were extremely rare. This site is a cobble beach with widely scattered boulders. Mussels were found attached to the undersides of a few of the larger boulders that could be turned over.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* was rare at this site and specimens were small. Collected organisms ranged from approximately 12-40 mm in shell length. The presence of many sea stars (*Pisaster* sp.) suggested that predation may partially explain the low densities of mussels at this site.
- 1996 There was only one small population of small *M. edulis* mussels found growing in the cobble beach. There is a single large 2 m high boulder at the base of the bluff, with a small brass U.S. Geodetic Survey marker on top. This was the only area that had any live mussels. Discrete stations were not possible, as there were only a few mussels on the one rock. One composite mussel sample was collected.
- 1997 No collection.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 Fine grained sediments were collected from 47° 54.44' N and 122° 22.19' W, in about 185 m of water.
- 1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +1.0 m MLLW

**SITE** - EVERETT HARBOR, PUGET SOUND, WA

**SITE CODE** - PSEH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 47° 58.36' N

122° 13.82' W

**LOCATED ON NOAA CHART** - 18444

**SITE ACCESS** - This site is a walk-up, and is easily accessible on foot. Prior permission has to be obtained from the Everett Port Authority, as access is needed to the site across their property. Take Exit 192 on U.S. Hwy. 5 in Everett, and go west on Mukilteo Blvd. Turn right (north) onto Rucker Ave. and then left (west) onto California St. Go under the railroad bridge and turn left (south) onto Terminal Ave. and into the Port area. Park next to the Maintenance Shop near Pier 1, and obtain the key to the corner gate through the fence to the seawall. A small boat is needed if sediments are to be collected. There is a good public ramp on 13th St., which is farther north off Marine View Drive. The ramp is on the Snohomish River, and inside the Everett Harbor Breakwater.

**SITE DESCRIPTION** - The site is located on the rocks of the breakwater and tidal flat below the Port Authority Maintenance Shop. The discrete stations on the breakwater are as follows: Station 1 is on the corner below the gate, Station 2 is about 15 m to the north and Station 3 is about 15 m east of Station 1.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a good population of small *M. edulis* mussels growing on the rock seawall. There was also a good crop of spat, and no seastars were observed in the immediate area.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 Fine grained sediments were collected from 47° 58.45' N and 122° 14.23' W, in about 86 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.25-0.5 m MLLW



**SITE** - POINT ROBERTS, POINT ROBERTS, WA

**SITE CODE** - PRPR

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 48° 59.42' N

123° 05.30' W

**LOCATED ON NOAA CHART** - 18421

**SITE ACCESS** - This site is a walk-up, and is easily accessible. To reach this site, one has to travel into Canadian Territory and then back again into the United States. Follow U.S. Hwy. 5 north to the Canadian border and cross over, then follow Hwy. 99 north towards Vancouver. At Delta, take Hwy. 17 south to Tsawwassen. In Tsawwassen, turn left (south) onto 56th St. and follow the signs to the U. S. border and Point Roberts. South of the border, the main road is called Tyee Drive. At the gas station and stop sign, turn right onto Gulf Rd. and drive to the end. Park in the parking lot next to Breaker's Bar, which is on the beach. If sediments are to be collected, a small boat is necessary. There is a small boat ramp on the beach at Lighthouse Point County Park, in Point Roberts. This ramp can only be used in good weather, as there is no protection from the wind and waves.

**SITE DESCRIPTION** - The western site is located about 0.35 mi to the north of the old dock pilings on the beach at Breaker's bar. The site is on the rocks in the intertidal area, below a small bluff. Due to the poor survival rate of the mussels at this site, there is an alternate site on the eastern side of Point Roberts. From the stop sign intersection, continue straight on and then turn left onto A.P.A. Rd. Continue on for about 1.5 mi until the road surface ends and it becomes a dirt road. Go through the gate and on to the end of the road at the beach. Go down the stairs and onto the beach, and the site is about 0.5 mi to the south at the large rock. The nominal site center for this eastern site is 48° 58.90' N and 123° 01.30' W.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 No live *M. edulis* mussels were found at either the east or the west sites.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The sediment sample was collected from near the nominal site center, southwest from the Red "4" Bell. The location was 48° 56.52' N and 123° 00.41' W, in about 63 m of water.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, +0.5 m MLLW

## ALASKA SITES

**SITE** - MOUNTAIN POINT, KETCHIKAN, AK

**SITE CODE** - KTMP

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 55° 17.63' N

131° 32.88' W

**LOCATED ON NOAA CHART** - 17428

**SITE ACCESS** - The site is easily accessed from Ketchikan by driving southeast down the highway towards Mountain Point. The site is located just below the parking area at mile marker 5.8, on the South Tongass Hwy., at the navigational marker tower on the shoreline. This bivalve site is a relatively easy walk-up site. There is a small boat ramp and breakwater about 0.25 mi to the east of the site, where a boat can be launched for sediment sampling.

**SITE DESCRIPTION** - The nominal site center is at the navigational marker, at Mountain Point. Station 1 bivalves (*M. edulis*) were collected some 3 m below the base of the marker, on a large seaward facing vertical rock. Station 2 mussels were collected from under a large rock overhang, facing the water, some 25 m northeast of Station 1. Station 3 was located a further 25 m northeast of Station 2, on the landward facing side of a 2.5 meter high rock form.

The topography is extremely steep and tidal currents are very strong through the channels. Subtidal depositional environments where fine sediments would likely be found were not evident in the entire Ketchikan area.

### BIVALVE COLLECTIONS

1995 *M. edulis* were abundant throughout the entire area. The mussels were all on the small side, occurring in dense patches and clusters on the rocks and boulders.

1996 No collection.

1997 *M. edulis* was collected in nominally the same sites as established in 1995. Though not as abundant as reported previously, there were sufficient numbers in patches at the base of and on the underside of large rocks. Organisms were on the small size (2-5 cm).

### SEDIMENT COLLECTIONS

1995 No collection.

1996 No collection.

1997 No collection.

### SAMPLING METHODS

Bivalves - hand

Sediments - hand held scoop, intertidal

**WATER DEPTH** - intertidal, + 0.75 m MLLW

**SITE - EAST SIDE, NAHKU BAY, AK**

**SITE CODE - NBES**

**TARGET SPECIES - *Mytilus edulis***

**NOMINAL SITE CENTER - 59° 27.20' N**

**135° 20.19' W**

**LOCATED ON NOAA CHART - 17317**

**SITE ACCESS** - The site is accessed from Skagway, by crossing the Skagway River and following the road southwest around to Yakutania Point. Drive 1.5 miles north on the Klondike Highway and turn left (west) onto Dyea Rd. Travel 1.75 miles along the road to just before the end of the pavement. Turn left (there is a log cabin and stop sign on the dirt road to the left), and then follow the dirt road downhill straight ahead to the rifle range (~ 0.5 miles), and further on to Smuggler's Cove. It is a short 100 meter walk down to the beach in the cove. Caution: if the dirt road is snow covered or muddy, a 4 wheel drive vehicle will be needed.

Logistics in and out of Skagway make the site a difficult one, even though the site is a walkup site accessed by a road. Accommodations in and travel to Skagway are seasonally limited (mostly closed in winter months, and in short supply during tourist season). Air freight can be a problem as all air freight is flown on small single engine aircraft on a space available basis (primary role is passengers).

**SITE DESCRIPTION** - The nominal site center is in Smuggler's Cove, just to the north of Yakutania Point on the eastern side of Nahku Bay. The three stations were situated along the north/northwestern side of the cove, in the intertidal zone.

#### **BIVALVE COLLECTIONS**

- 1995 *M. edulis* mussels were abundant throughout the area. More than 80% of the mussel population was less than 2 cm long, and occurred in a 1.5 meter band at the low tide mark. The area is ice bound during the winter months, so that the majority of the mussels are all juveniles.
- 1996 No collection.
- 1997 *Mytilus* is very abundant and ranges several meters throughout the intertidal zone, from MLW to ~3 m above. There was a good quantity of mussels and the size of the individuals was large 4-10 cm. A composite sample was taken from the south end of the cover all the way around to the north end.

#### **SEDIMENT COLLECTIONS**

- 1995 No collection.
- 1996 No collection.
- 1997 Sediments were collected from the location of the National Benthic Surveillance Project site, which was last sampled in 1984. The site was located in the extreme upper end of Nahku Bay (also known locally as Long Bay), at 59° 28.65 N, 135° 20.21 W. The site is approximately 1.9 miles north of Skagway harbor and 1.5 miles north of the mussel site. The location is in the center of the tip of Nahku Bay and approximately 50 m from shore at low tide. Water depth is 16 to 18 m. Sediments were a light gray and black variegated silty mud. Some debris (sticks, shell and rock fragments) was retrieved in some discarded grab samples. The sediments as well as the upper end of the bay in the intertidal zone smelled of hydrogen sulfide.

A very small creek drained into the upper end of this very steep/deep fjord embayment, and morphology of the basin suggests that circulation is poor.

## **SAMPLING METHODS**

Bivalves - hand

Sediments -stainless steel grab and stainless steel scoop; 18 m

**WATER DEPTH** - intertidal, + 0.5 m MLLW

**SITE** - SHEEP BAY, PRINCE WILLIAM SOUND, AK

**SITE CODE** - PWSH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 60° 38.44' N

145° 59.40' W

**LOCATED ON NOAA CHART** - 16709

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). The site is remote and can only be accessed by seaplane or by a long open water boat ride. The site is located in a small cove, just to the north of Sheep Point on the eastern side of Sheep Bay. Sheep Bay is located north-east of Orca Bay, which lies at the eastern end of Prince William Sound. The nearest town of any size is Cordova, which lies some twenty miles to the east-southeast.

**SITE DESCRIPTION** - The three stations were collected along a 30 m transect, in the intertidal zone in the small cove. The transect is marked ("SHB") with steel markers.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* mussels were abundant throughout the area, occurring in a dense band on the rocks and boulders in the intertidal zone. The mussels were all fairly small and decreased in numbers as one progressed up the intertidal area.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected from in and around the rocks near the mussel transect.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 2.1 m MLLW

**SITE** - KNOWLES HEAD, PRINCE WILLIAM SOUND, AK

**SITE CODE** - PWKH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 60° 41.28' N

146° 35.01' W

**LOCATED ON NOAA CHART** - 16708

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). This remote site can only be reached by boat or seaplane. The site is located in a small cove at the western end of Knowles Bay - just to the east of Knowles Head, on the western end of the peninsula between Port Gravina and Port Fidalgo. The site is in the northeastern quadrant of Prince William Sound and is some 25 mi southeast of Bligh Reef (Exxon Valdez).

**SITE DESCRIPTION** - The nominal site center for the site is in a small cove at the western end of Knowles Bay. The three stations were collected from the eastern side of the cove, along a 30 meter transect above the low tide level.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* mussels were abundant throughout the area, occurring in a dense band along the intertidal zone.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected from the area adjacent to the transect line, in between the rocks and boulders.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 2.4 m MLLW

**SITE** - MINERAL CREEK FLATS, PORT VALDEZ, AK

**SITE CODE** - PVMC

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 61° 07.97' N

146° 27.66' W

**LOCATED ON NOAA CHART** - 16707

**SITE ACCESS** - The site can be accessed by boat or float plane from Valdez. The site is approximately five miles west of Valdez, and approximately 2 miles west of the mouth of Mineral Creek.

**SITE DESCRIPTION** - The nominal site center is on the shoreline, just to the east of the mouth of Gold Creek, which lies to the west of Mineral Creek ~ 5 miles west of Valdez on the north side of Port Valdez. Gold Creek forms a gravel bar as it enters Prince William sound. This bar curves to the west, paralleling the shoreline. The mussels were located just east of this bar, beginning where the gravel bar grades into a rocky shoreline.

As with the Ketchikan and Unakwik sites, there was no morphology in the area which would suggest the presence of fine sediments, except possibly in the very deep waters far from shore. Sediments deposited from Gold creek were coarse rocks and gravel, both inside and outside the bar.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* mussels are abundant throughout the area, occurring in a wide band along the intertidal zone. Most of the mussels were fairly small, as the area is iced-in during the winter months.

1996 No collection.

1997 *M. edulis* was not abundant during this year's collection, but was found in a fairly narrow band in the intertidal zone near MLW. Among the large rocks, adequate aggregations were found in the 2-5 cm size range. There was evidence of much mortality (recently empty shells) in the intertidal zone, perhaps due to ice scouring or predation

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

**WATER DEPTH** - intertidal, + 2.0 m MLLW

**SITE** - SIWASH BAY, UNAKWIK INLET, AK

**SITE CODE** - UISB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 60° 57.65' N

147° 38.76' W

**LOCATED ON NOAA CHART** - 16700

**SITE ACCESS** - This site is a truly remote one, and can only be reached by seaplane or a small boat launched from a larger vessel. Siwash Bay, off Unakwik Inlet, lies some ninety miles west of Valdez. The area is iced-in during the winter months (quite often through to the end of March), and this inhibits access to the area. This site is difficult to access due to its physical remoteness, and the rapidly changing weather conditions in Prince William Sound and the mountains to the west.

**SITE DESCRIPTION** - The nominal site center is in a small cove on the south side of Siwash Bay, and south of the island at the entrance to the inlet. Mussels are not numerous and were most often found associated with barnacles encrusting the larger rocks of the shoreline at the upper end of the intertidal zone.

#### **BIVALVE COLLECTIONS**

1995 There were very few *M. edulis* mussels to be found in the area, and the three stations were not differentiated due to the lack of the sample size. There were only enough mussels for one consolidated sample. The broken ice was still very thick along the shoreline, and this was a contributing factor to the lack of mussels.

1996 No collection.

1997 As in 1995, mussels were not numerous and distinct stations were not differentiated. Mussels were small 2-5 cm and were scattered primarily on the larger rocks and at the rock/substratum (cobble & rock beach) interface. Though sampled two weeks earlier than in 1995, the entire bay and Unakwik Inlet were ice free at the time of this year's sampling. A GPS location of 60° 57.46 N and 147° 37.07 W was recorded for the site center, and was found to be at slight variance with the 1995 reported position 60° 57.65' N, 147° 38.76' W. This would seemingly place the 1995 site 0.8 nautical miles or 1566 m northwest of the position of the cove as sampled this year.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 1.0 m MLLW

**SITE** - DISK ISLAND, PRINCE WILLIAM SOUND, AK

**SITE CODE** - PWDI

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 60° 29.58' N

147° 39.35' W

**LOCATED ON NOAA CHART** - 16705

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). This is another remote site in south-western Prince William Sound, just to the north of Knight Island. Access to the area is limited to a few options - a seaplane ride out of either Seward or Valdez, or a long boat ride from either one of these ports.

**SITE DESCRIPTION** - The site is located on the southwest side of Disk Island, in a small cove facing Louis Bay. The bivalves are located in a wide band on the rocks in the intertidal zone. The samples were collected from a 30 m long transect, previously set up to monitor the effects of the Exxon Valdez oil spill.

#### **BIVALVE COLLECTIONS**

1995 Small *M. edulis* mussels were abundant throughout the area, occurring in dense patches and under/in-between the rocks.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected from the same area as were the mussels.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 1.5 m MLLW

**SITE** - SLEEPY BAY, PRINCE WILLIAM SOUND, AK

**SITE CODE** - GASL

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 60° 04.04' N

147° 49.53' W

**LOCATED ON NOAA CHART** - 16702

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). This remote site is to the south of Prince William Sound, on the western side of Montague Strait. Sleepy Bay lies at the northern end of Latouche Island. Access to the site is obviously fairly limited, and involves either a long seaplane ride or an even longer boat trip. A small boat has to be deployed from a larger vessel, so as to gain access to the shoreline.

**SITE DESCRIPTION** - The site is located on the northwestern corner of Sleepy Bay. The rocky shoreline is interspersed with cobble/pebble beaches, with the conifer forest extending down to the rocks. The samples were collected from a previously established 30 meter long transect, which is used to monitor the effects of the Exxon Valdez oil spill.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* mussels occur throughout the area, growing on/in-between the rocks and pebbles on the shoreline. The wide intertidal zone is generally covered with algae and mussels. The mussel population varied from one end of the transect to the other - from dense to scarce.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected adjacent to the mussel transect line.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 2.2 m MLLW

**SITE** - WINDY BAY, GULF OF ALASKA, AK

**SITE CODE** - GAWB

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 59° 13.12' N

151° 31.02' W

**LOCATED ON NOAA CHART** - 16645

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). This remote site lies at the southwestern end of the Kenai Peninsula. Windy Bay is located to the north of the Chugach Islands (East Chugach Is.) in the Kennedy Entrance, between the Kenai Peninsula and the Kodiak Islands. Here again, access is limited due to the remoteness of the site. Access is gained via a seaplane ride from Homer, or a long open water boat ride.

**SITE DESCRIPTION** - The Windy Bay site is located in a small cove on the south side of the bay, to the northeast of Badger Hill. The samples were collected from a previously established 30 m long transect on the rocky shoreline.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* mussels were abundant throughout the area, in the intertidal zone.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected adjacent to the mussel transect line.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 2.14 m MLLW

**SITE** - HOMER SPIT, COOK INLET, AK

**SITE CODE** - CIHS

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 59° 36.87' N

151° 26.65' W

**LOCATED ON NOAA CHART** - 16645

**SITE ACCESS** - This site is easily accessed by vehicle, with a short walk out onto the mud flat at low tide. The site is located on the northeast side of Homer Spit. From the Tesora Alaska and Texaco gas stations at the corner of Ocean Drive and Homer Spit, follow the road out about 2.75 mi towards Coal Point (at the end of Homer Spit). Turn left onto a small dirt road that continues northeast for about 30 m and then ends. From here, walk out some 75 m to the shoreline where the site is located.

**SITE DESCRIPTION** - The site is situated along the shoreline of the extensive mud flats to the northeast of Homer Spit. During the winter months, the entire area is frozen over with a thick (0.5 - 1.0 meter) layer of ice. Along the shoreline, the layer of ice is broken up and the mussels can be found by searching along these breaks.

#### **BIVALVE COLLECTIONS**

1995 Bivalve collection was hampered by the fact that the entire area was covered by broken ice, up to a meter thick in places. *M. edulis* mussels were found under the ice, growing on the frozen intertidal mud flat.

1996 No collection.

1997 Hand collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment samples were collected from the same stations as were the bivalves.

1996 No collection.

1997 The sediment samples were collected from the same stations as were the bivalves.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 0.5 m MLLW

**SITE** - SHUYAK HARBOR, GULF OF ALASKA, AK

**SITE CODE** - GASH

**TARGET SPECIES** - *Mytilus edulis*

**NOMINAL SITE CENTER** - 58° 30.06' N

152° 37.31' W

**LOCATED ON NOAA CHART** - 16605

**SITE ACCESS** - This site was sampled in conjunction with the Prince William Sound - Long Term Monitoring Project (L-TEMP). This remote site lies on Shuyak Island, which is on the south side of the Stevenson Entrance between the Gulf of Alaska and Shelikof Strait/Cook Inlet. Shuyak Island lies to the north of Afognak Island, which lies just to the north of Kodiak Island. Access to the site is limited to either a long open water boat ride, or by seaplane. The departure point can be from either Homer (to the north) or from Kodiak (to the south and somewhat more remote).

**SITE DESCRIPTION** - Shuyak Harbor is a small cove situated on the south-western corner of Shuyak Island, to the west of Port William. The site is located on the eastern side of the cove, on an established 30 meter long transect.

#### **BIVALVE COLLECTIONS**

1995 *M. edulis* specimens were abundant throughout the area, occurring in a wide band along the intertidal zone.

1996 No collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 The sediment sample was collected adjacent to the mussel transect.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand held Teflon coated scoop

**WATER DEPTH** - intertidal, + 2.0 m MLLW



**SITE** - KEEHI LAGOON, HONOLULU HARBOR, HI

**SITE CODE** - HHKL

**TARGET SPECIES** - *Ostrea sandvicensis*

**NOMINAL SITE CENTER** - 21° 19.00' N

157° 53.15' W

**LOCATED ON NOAA CHART** - 19367

**SITE ACCESS** - This site is a walk-up, and is easily accessible. From the Nimitz Hwy. (Route 92), take the Sand Island Access Rd. (Route 64) and head south. Drive past the Kapalama Military Reservation and turn left into the University of Hawaii, Dept. of Oceanography Marine Facility, just before the Bascule Bridge onto the Sand Island State Recreation Area. There is a security guard at the gate who will escort one to the site. Drive around to the eastern side of the research vessel dock, the unpaved road ends at the black sand blasting area. Walk past the large satellite dish towards a small shack to get to the site.

**SITE DESCRIPTION** - The site is located at the western end of the Kapalama Basin in a small boat basin owned by the University of Hawaii, and is not in the Keehi Lagoon area at all. The nominal site center is at the old concrete dock pilings, just to the west of the "grounded" wooden wreck (marked on NOAA chart 19367). There are no discrete stations here, as there were only a few oysters to sample in a limited area.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 There was a very sparse population of *Ostrea sandvicensis* oysters growing on the pilings around the end of the dock.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 The light brown silty sand sediment sample was collected off the side of a research vessel, moored just to the west of the bivalve site.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand, by snorkeling

Sediments - stainless steel sediment grab and stainless steel scoop

**WATER DEPTH** - intertidal, 0-1.0 m MLLW

**SITE** - KANEOHE BAY, HAWAII, HI

**SITE CODE** - HHKB

**TARGET SPECIES** - *Ostrea sandvicensis*

**NOMINAL SITE CENTER** - 21° 24.71' N

157° 46.73' W

**LOCATED ON NOAA CHART** - 19359

**SITE ACCESS** - This site is a walk-up, and is easily accessible. From Hwy. H-1 in Honolulu, take the Pali Hwy. (Hwy. 63) north towards Kailua. When Hwy. 63 ends, the road continues on and is called Kuulei. In Kailua, turn left where the road intersects Kalaheo. Continue on and go under Hwy. 65 and Hwy. H-3, where the road is now called Kaneohe Bay Drive. This road joins up with Hwy. 65 in Kokokahi. Turn right onto Likeke Place, then left when the road comes to a "T" in a residential area. The road will dead end next to the YMCA, and the site is about 25 m away on the beach.

**SITE DESCRIPTION** - The nominal site center is located at an old concrete and wood pier on the beach, on the southeastern shores of Kaneohe Bay.

#### **BIVALVE COLLECTIONS**

1995 First collection in 1996.

1996 There was a small population of Hawaiian oysters, *Ostrea sandvicensis*, growing on the concrete and rocks of the old pier. The oysters were in insufficient numbers to create discrete sampling stations, so the sample is a composite one.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1996 The dark brown silty sand sediment sample was collected from near the bivalve nominal site center, on the beach.

1997 No collection.

#### **SAMPLING METHODS**

Bivalves - hand

Sediments - hand, stainless steel scoop

**WATER DEPTH** - intertidal, +0-1.0 m MLLW

**SITE** - NAWILIWILI HARBOR, KAUAI, HI

**SITE CODE** - KAU1

**TARGET SPECIES** - *Ostrea sandvicensis*

**NOMINAL SITE CENTER** -21° 57.40' N

159° 21.35' W

**LOCATED ON NOS CHARTS** - 19381, 19383

**SITE DESCRIPTION** - The sampling site is situated west of the east breakwater of Nawiliwili Harbor. The oysters are attached to the rocks and concrete rubble.

**SAMPLING METHODS** - Intertidal hand collection.

**BIVALVE COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

**SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

**SAMPLING METHODS**

Bivalves - hand

**WATER DEPTH** - intertidal, -0.5 m MLLW

## WISCONSIN SITES

**SITE** - BAYSHORE PARK, GREEN BAY, WI

**SITE CODE** - GBBS

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 44° 38.22' N†

87° 48.49' W

**Sediments** - 44° 37.84' N

87° 50.57' W

**LOCATED ON NOAA CHART** - 14910, 14918

**SITE ACCESS** - Samples are collected in the vicinity of Bayshore Park. To get there from Interstate 43, take exit 113 onto state Hwy. 54. This highway intersects state Hwy. 57. Continue north on Hwy. 57 for about 12 mi and stay alert for Bayshore Park signs. Make a left turn off of Hwy. 57 and it is only a short distance to the Park.

**SITE DESCRIPTION** - Zebra mussel sampling was performed by snorkeling to 4-5 m depths to hand collect cobbles. Shallower depths provided fewer mussels in the required size range and required hours of additional work. The site was accessed by swimming out from the shore.

Fine grain sediments were successfully collected from three distinct stations located just southwest of Bayshore Park.

### BIVALVE COLLECTIONS

1995 No collection.

1996 Shore snorkeling collection.

1997 No collection.

### SEDIMENT COLLECTIONS

1995 No collection.

1996 No collection.

1997 No collection.

### SAMPLING METHODS

Mussels - hand, snorkeling

Sediments - boat, PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 4-5 m  
sediment, 6 m

**SITE - MILWAUKEE BAY, LAKE MICHIGAN, WI**

**SITE CODE - LMMB**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 43° 01.93' N**

**87° 53.71' W**

**Sediments - 43° 02.53' N**

**87° 53.53' W**

**LOCATED ON NOAA CHART - 14924**

**SITE ACCESS** - The boat was launched from McKinley Marina, in downtown Milwaukee, located within the Juneau Park-McKinley Park waterfront. To get there, take Interstate 94/43 north into Milwaukee, continuing north on I-43 after it splits off from I-94. Shortly thereafter, exit off Interstate 43 onto Wisconsin Ave. and travel east towards Juneau Park. Wisconsin feeds into Lincoln Memorial Drive. Look for signs in one-half to 1 mi for McKinley Marina boat launch.

**SITE DESCRIPTION** - The boat was anchored about 100 m off the limestone (rip-rap) harbor pavilion. Zebra mussels were collected, by snorkeling, from the limestone rip-rap facing Juneau Park. Three zebra mussel stations were sampled along the pavilion and provided adequate sample material with relative ease. This mussel collection site can also be accessed directly without the use of a boat.

#### **BIVALVE COLLECTIONS**

1995 No collection.

1996 Snorkeling collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - hand, snorkeling

Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 2 m

sediments, 4 m

## ILLINOIS SITES

**SITE** - NORTH CHICAGO, LAKE MICHIGAN, IL

**SITE CODE** - LMNC

**TARGET SPECIES** - *Dreissena sp*

**LOCATED ON NOAA CHART** - 14904, 14905

**NOMINAL SITE CENTER** - 42° 18.28' N

87° 49.64' W

**SITE ACCESS** - This launch site can be reached from state Hwy. 32 by taking Grand Ave. east, turning right at the T-intersection onto Pershing Rd., and then taking the second left onto Madison St. which leads into North Shore Marina. The Great Lakes Naval Training Center is located approx. 4 mi due south of Waukegan.

**SITE DESCRIPTION** - Three zebra mussel stations were sampled on the outside of the southern breakwater and were separated by a 5 - 10 m distance. Sediments were not successfully sampled because of the sandy nature of the bottom substrate off of North Chicago.

### BIVALVE COLLECTIONS

1995 No collection.

1996 Snorkeling collection.

1997 No collection.

### SEDIMENT COLLECTIONS

N/A

### SAMPLING METHODS

Mussels - hand, snorkeling

Sediments - N/A

**WATER DEPTH** - 2 m

## INDIANA SITES

**SITE** - CALUMET BREAKWATER, LAKE MICHIGAN, IN      **SITE CODE** - LMCB

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 41° 43.63' N                      87° 29.70' W

**LOCATED ON NOAA CHART** - 14927, 14929

**SITE ACCESS** - The Hammond Marina in Hammond, Indiana is the best location from which to access this site, which is located on the outer portion of a breakwater. This launch site can be reached from Interstate 80/94 by exiting at U.S. 41 (Calumet Ave.) and heading north towards Lake Michigan, approximately 6 - 7 mi.

**SITE DESCRIPTION** - The zebra mussel site is located just northeast of the marina, across the Calumet Harbor channel. The boat was tied up outside the southern point of the Calumet breakwater, allowing snorkelers to walk 100 m further south near the breakwater point. While relatively plentiful, these mussels were more tenacious in their attachment to the limestone substrate than zebra mussels found at other sites.

Sediments were not successfully sampled because of the sandy nature of the bottom substrate off the Hammond and Calumet Breakwaters.

### **BIVALVE COLLECTIONS**

1995    No collection.  
1996    No collection.  
1997    No collection.

### **SEDIMENT COLLECTIONS**

N/A

### **SAMPLING METHODS**

Mussels - hand, snorkeling

**WATER DEPTH** - 4 m





**SITE** - LEELANAU STATE PARK, TRAVERSE BAY, MI      **SITE CODE** - TBLL

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 45° 12.34' N                      85° 32.21' W

**LOCATED ON NOAA CHART** - 14942

**SITE ACCESS** - From Traverse City travel north on Route 22 to the town of Northport. From Northport travel north on Route 201 to Route 640, which converges with Woolsey Lake Rd. (bear left). Follow signs to Leelanau State Park. Wollsey Lake Rd. becomes Lighthouse Point Rd. Turn onto Route 629 (left) and follow to Lighthouse point.

**SITE DESCRIPTION** - Zebra mussels were collected about 200 m offshore in 2 m of water. The site is off of camp site numbers 45 and 46, which are located along Lakeshore Campground Rd. Mussels were attached to cobbles.

**BIVALVE COLLECTIONS**

1995    N/A

1996    Snorkeling collection. Usually one to three mussels were collected per rock.

1997    No collection.

**SEDIMENT COLLECTIONS**

N/A

**SAMPLING METHODS**

Mussels - hand, snorkeling

**WATER DEPTH** - mussels, 2 m

**SITE** - THUNDER BAY, LAKE HURON, MI

**SITE CODE** - LHTB

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 44° 55.33' N

83° 24.81' W

**LOCATED ON NOAA CHART** - 14863,14869

**SITE ACCESS** - Drive south from Alpena on Route 23 and turn left (east) onto Ossineke Rd then make a right turn onto State St. The site access is at Ossineke Park.

**SITE DESCRIPTION** - Zebra mussels were collected about 250 m offshore in 2 m of water. Mussels were attached to cobbles. Gravel and cobble bars containing mussels run parallel to shore.

#### **BIVALVE COLLECTIONS**

1995 N/A

1996 Snorkeling collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

N/A

#### **SAMPLING METHODS**

Mussels - snorkeling

**WATER DEPTH** - mussels, 2 m

**SITE - SAND POINT, SAGINAW BAY, MI**

**SITE CODE - SBSP**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 43° 54.59' N**

**83° 24.01' W**

**LOCATED ON NOAA CHART - 14863**

**SITE ACCESS** - From Bay City, Michigan drive state Route 25 east and then northeast. Make a left turn (west) onto Crescent Beach Rd. at signs for the Sand Point peninsula. Drive to the end of the public access road. Walk to the south end of the sand spit along the paved road, boardwalk, and sandy beach trail. Zebra mussels were found in shallow water.

**SITE DESCRIPTION** - The mussels were attached to the upper portion of the valves of living Unionid clams. In 1995, most zebra mussels were found attached to other zebra mussels or to small rocks, few unionid clams were found.

#### **BIVALVE COLLECTIONS**

1995 Mussels sparse at this site.

1996 Mussels sparse at this site.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

This is a sand spit and no fine grained sediments exist at this location.

#### **SAMPLING METHODS**

Mussels - wading, snorkeling, hand

**WATER DEPTH - 1-2 m**

**SITE - SAGINAW RIVER, SAGINAW BAY, MI**

**SITE CODE - SBSR**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER- 43° 40.41' N**

**83° 50.20' W**

**LOCATED ON NOAA CHART - 14863, 14867**

**SITE ACCESS** - To get to the launch site follow Route 15 (known as Center Ave. east of the Saginaw River) East through Bay City. At Scheurman Rd. make a left turn (to the north) and then turn right onto Woodside Ave. Follow Woodside for the distance of about one block until coming to the Essexville city hall. Make a left turn, just prior to the city hall. The public park of Essexville, next to the sewage treatment plant, contains a boat ramp.

**SITE DESCRIPTION** -This site is near the mouth of the Saginaw River, to the west of the dredged ship channel and across this same channel from a dredge spoil island. The island is labeled "Channel Island" on NOAA chart 14867. Sand and sand mixed with clay sediments were collected from this site in 1992.

#### **BIVALVE COLLECTIONS**

1995 Dredge collection. Mussels were plentiful.  
1996 Dredge collection. Mussels were plentiful.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - Epibenthic dredge collection  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 5 m  
sediments, 5 m

**SITE - BLACK RIVER CANAL, LAKE HURON, MI**

**SITE CODE - LHBR**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 43° 02.66' N**

**82° 26.32' W**

**LOCATED ON NOAA CHART - 14865**

**SITE ACCESS** - The boat was launched at the municipal boat launch in Port Huron on the Black River. From the Black River, proceed to the St. Clair River and head out to Lake Huron. Then travel north along the Lake Huron shoreline. The launch site is located close to where Interstate 94 crosses the Black River. The launch site is off of Water St. at the 14th St. Pier. Alternately, the site can be accessed directly by driving south on Route 25 from Lakeport. Where Route 25 intersects Keewahdin Rd. turn left (east) and follow the road to Lake Huron. The sampling site is offshore approximately 200 m.

**SITE DESCRIPTION** - The sediments at this site are comprised of a clay-sand mix with occasional cobbles and aquatic vegetation. The water clarity was very high and often the bottom of the lake was visible at depths greater than 15 ft. The cobbles with which the mussels are associated run in bands parallel to shore. The preferred way to retrieve these large stones is by snorkeling. A few mussels were attached to each rock at the sediment water interface.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.

1996 Snorkeling collection.

1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling, hand

Sediments - boat, PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 5 m

sediments, 6 m

**SITE** - ANCHOR BAY, LAKE ST. CLAIR, MI

**SITE CODE** - LSAB

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 42° 38.95' N

82° 42.66' W

**LOCATED ON NOAA CHART** - 14850

**SITE ACCESS** - The boat was launched from a public boat ramp on the eastern end of South River Rd. To get to this site, exit Interstate 94 at exit 237 (Mount Clemens, MI) and proceed east on North River Rd., after 1.8 mi turn right onto Bridgeview Rd. to cross the Clinton River. At the next intersection, turn left onto South River Rd. and proceed east for about 3-4 mi until the road ends at the boat launch.

**SITE DESCRIPTION** - The sampling site is to the northeast of the boat launch and west of the North Channel of the St. Clair River, in Anchor Bay. The sampling depth was in 8-12 ft of water. Mussels are attached to aquatic plants and to unionid clams. The clam population was reduced in 1995 over previous years and so zebra mussels were hard to locate.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection with retrieval of unionid clams with attached zebra mussels.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, snorkeling  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 4 m  
sediments, 4 m

**SITE** - STONY POINT, LAKE ERIE, MI

**SITE CODE** - LESP

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 41° 57.52' N

83° 13.98' W

**METHOD OF BIVALVE COLLECTION** - Dredge collection.

**LOCATED ON NOAA CHART** - 14830, 14846

**SITE ACCESS** - From interstate 75, take exit 15 near Monroe, Michigan. At the end of the exit ramp, turn left onto North Dixie Hwy. Travel on N. Dixie Hwy. (away from Monroe) for approximately 0.75 mi, then turn right into Sterling State Park. Follow the State Park Rd. until it ends at the public boat launch site.

**SITE DESCRIPTION** - The site is just north of Stony Point, between Point aux Peaux and Swan Creek. The predominate land mark is the Enrico Fermi Nuclear Power Plant, to the west. Dredging for mussels required a few short tows to obtain adequate sample material. Sediments collected during 1992 were soft and mostly anoxic.

#### **BIVALVE COLLECTIONS**

1995 Dredge collection.

1996 No collection.

1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge

Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 5-6 m

sediments, 5-6 m

## OHIO SITES

**SITE** - RENO BEACH, LAKE ERIE, OH

**SITE CODE** - LERB

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 41° 40.47' N

83° 13.57' W

**LOCATED ON NOAA CHART** - 14830, 14847

**SITE ACCESS** - The launch ramp for this site is at the Sterling State Park (same boat launch used for Stony Point site). This sampling site is east of Maumee River and Maumee Bay and is located off of Reno Beach in water of 5-6 m depth. A closer launch site is located about 8 mi east of Toledo, Ohio off of Rt. 2. Look for a sign called "Magee Marsh State Boat Launch" (just before Rt. 2 bends south on the roadmap) designating the launch site. It is a small launch that feeds into the shallow Ward Canal.

**SITE DESCRIPTION** - As at the Stony Point, site mussels are numerous and are associated with fine grained sediments. Finer grained sediments are found in slightly deeper water than the mussels.

### BIVALVE COLLECTIONS

1995 Dredge collection.  
1996 No collection.  
1997 Anticipated collection.

### SEDIMENT COLLECTIONS

1995 No collection.  
1996 No collection.  
1997 No collection.

### SAMPLING METHODS

Mussels - boat, epibenthic dredge  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 6m  
sediments, 7 m

**SITE** - PEACH ORCHARD POINT, SOUTH BASS, OH

**SITE CODE** - SBPP

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 41° 39.58' N

82° 49.50' W

**LOCATED ON NOAA CHART** - 14830, 14844

**SITE ACCESS** - To reach this site one must take a ferry from Catawba Island to South Bass Island. To get to Catawba Island, State Route 2 can be taken to Route 53 to the ferry terminal. From the ferry terminal on South Bass Island, drive to an area northwest of Put-in-Bay (Peach Orchard Point) at the northern end of the island. Cut across the middle part of the Island to avoid the busy Put-in-Bay marina area. The Ohio State University Sea Grant field laboratory is located at Peach Orchard Point and this group has helped with past sample collections.

**SITE DESCRIPTION** - Rocks with attached mussels were collected by snorkeling around the reef off Peach Orchard Point. Fine grained sediments are found in deeper water north of Peach Orchard Point.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.

1996 No collection.

1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling

Sediments - Hand held Ekman grab and Kynar coated scoop

**WATER DEPTH** - mussels, 2 m

sediments, 5 m

**SITE** - OLD WOMAN CREEK, LAKE ERIE, OH

**SITE CODE** - LEOW

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 41° 23.10' N

82° 31.12' W

**LOCATED ON NOAA CHART** - NOAA Chart 14830. This is the only NOAA chart available for the site. Unfortunately, the scale does not provide much detail.

**SITE ACCESS** - Traveling from the west (e.g., South Bass Is.) proceed east on Route 6 past the town of Huron. The entrance road to the site is immediately to the left (North) before the Route 6 bridge that crosses Old Woman Creek. The Old Woman Creek visitor center is reached by proceeding over the bridge and traveling approximately another quarter mi. The entrance to the visitor center is on the south side of the highway.

**SITE DESCRIPTION** - Small zebra mussels are attached to stones lying near the base of the jetty to the West of the mouth of Old Woman Creek. This jetty borders the boundary of this National Estuarine Research Reserve. When the creek is flowing this site is affected by water and contaminants that might be associated with the creek water or its sediments.

Sediments were collected within Old Woman Creek. There is a projection, to the east, within the creek near its mouth. Samples were taken along this projection. The first sample was taken nearest to the main channel of the Creek with the other two stations progressing, sequentially, further to the east.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.  
1996 Snorkeling collection.  
1997 No collection.

#### **SEDIMENT COLLECTIONS**

1995 Fine grained sediment collected with hand held petite PONAR grab.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling  
Sediments - Hand held petite PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 2 m  
sediments, 1 m

**SITE** - LORAIN, LAKE ERIE, OH

**SITE CODE** - LELR

**TARGET SPECIES** - *Dreissena* sp.

**LOCATED ON NOAA CHART** - 14841, 14826

**NOMINAL SITE CENTER** - 41° 27.67' N

82° 12.42' W

**SITE ACCESS** - Proceeding from the east on Route 2, from the South Bass site, or from the east on James W. Shocknessy Ohio Turnpike, turn North onto Route 58 and proceed to Lorain, OH. Turn right onto West Erie Ave., Route 2, followed by a left turn onto Oberlin Ave. which leads to the municipal pier.

**SITE DESCRIPTION** - The site is located approximately one nautical mile to the west from the harbor mouth, just west of the navigational aid indicated as "FI Y 2.5s 30ft 4 St M", in 12 to 15 ft of water. Fine grained sediment were found in 30 ft of water, north of the zebra mussel site.

#### **BIVALVE COLLECTIONS**

1995 Hard bottom, both epibenthic dredge and snorkeling used to collect mussels.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge and snorkeling  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 4 m  
sediments, 6 m

**SITE - ASHTABULA, LAKE ERIE, OH**

**SITE CODE - LEAB**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 41° 55.48' N**

**80° 43.10' W**

**LOCATED ON NOAA CHART - 14836 (harbor area), 14825 (sampling area)**

**SITE ACCESS** - Coming from Cleveland, OH proceed east on Interstate 90 and proceed north to Ashtabula on Route 11. Boat ramps can be found by turning right on Harmon Rd. followed by a left on Minnesota Ave. Travel only a short distant on Harmon Rd., make sure not to miss Minnesota Ave. Boat ramps exist where Minnesota Ave. meets the Lake.

Alternately, take exit 235 on Interstate 90 and proceed north on Route 193 to Kingsville-on-the-Lake. The site is located to the West of the Intersection of Routes 193 and Route 531 (the Lake shore road).

**SITE DESCRIPTION** - Mussels were successfully collected in 5 m of water using an epibenthic dredge in 1994 and by snorkeling in 1995. The site is northeast of Ashtabula.

Fine grain sediments were collected in 45 ft of water further offshore from the bivalve site. Note, avoid the dredge spoil dumping area north of Ashtabula.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge and snorkeling  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 5 m  
sediments, 15 m

## NEW YORK SITES

**SITE - DUNKIRK, LAKE ERIE, NY**

**SITE CODE - LEDK**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 42° 31.75' N**

**79° 16.66' W**

**LOCATED ON NOAA CHART - 14823**

**SITE ACCESS** - Proceeding East on the New York State Thruway 90 exit onto Hwy. 60 and proceed north to Dunkirk. From Fredonia, proceed north on route 60 for 6 mi. In Dunkirk, make a left turn from Hwy. 60 (Main St.) on to Lake Shore Drive and proceed to Central Ave. Make a right turn onto Central Ave. which ends at the municipal pier and boat launch.

**SITE DESCRIPTION** - The bivalve site was established to the northeast of Dunkirk and is located off the mouth of Beaver Creek. Mussels were collected by a deep water epibenthic dredge collection at the location of the sediment site.

In 1994, large cobble stones caused some of the dredge netting to tear. Unfortunately, less than 100 mussels were collected at this site. In an effort to find enough mussels for analyses, snorkeling was used to collect mussels in large quantities on rocks in shallow waters. Mussel were small with only a few larger mussels attached to each cobble. In 1995 it was discovered that mussels can be collected with greater success by dredging in deeper water (10 m range).

### **BIVALVE COLLECTIONS**

1995 Epibenthic dredge collection.  
1996 No collection.  
1997 Anticipated collection.

### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge collection  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 10 m  
sediments, 10 m

**SITE** - NIAGARA FALLS, NIAGARA RIVER, NY

**SITE CODE** - NRNF

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 43° 02.81' N

78° 53.52' W

**LOCATED ON NOAA CHART** - 14832

**SITE ACCESS** - From Route 90 get onto the Buffalo Beltway and proceed north to exit 1 for Tonawanda. Find River Rd. (Routes 265/384) and proceed northwest along the east fork of the Niagara River. Public ramps are located at the northern edge of town.

**SITE DESCRIPTION** - Bivalves are collected outside of the breakwater of the Niagara River Yacht Club. Be sure not to collect zebra mussels that are attached to non-natural substrates that are part of the breakwater. The current is extremely fast and can sweep a non-proficient swimmer away. Zebra mussels were found in small clumps down current of bottom rooted aquatic plants. Mussels were usually found as individuals. Each dive usually resulted in 5 or fewer mussels being collected.

Mud mixed with sand was collected on the east side of Cayuga Island at the mouth of the Little River. The fine grained sediments were associated with aquatic plants. Avoid collecting sediments close to shore because land fill activities were under way there in 1994. The sediment site is approximately 4 mi down river from the zebra mussel site.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 2 m  
sediments, 2 m

**SITE - OLCOTT, LAKE ONTARIO, NY**

**SITE CODE - LOOC**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 43° 21.32' N**

**78° 41.20' W**

**LOCATED ON NOAA CHART - 14806**

**SITE ACCESS** - Proceed northwest from the Niagara Falls site along River Rd., connecting to the Robert Moses Parkway. Follow the Parkway as it travels west, then north along the Niagara River bank. Signs for Youngstown and also Route 18 are found along this route. Follow signs to pick up Rt. 18 which runs east along the shore of Lake Ontario. Continue on Route 18 east to Olcott, NY. The boat ramp is just to the west of Eighteen Mile Creek in Olcott, NY, at the Newfane Marina. A visible landmark is a large water tower, immediately above the marina. When leaving from the marina be careful to not damage the propeller blades on a shoal found in the main channel.

**SITE DESCRIPTION** - Mussels are collected from a boat to the northeast of Olcott, NY. Zebra mussels were collected with an epibenthic dredge. Samples should not be taken directly offshore of the town of Olcott because a dredge spoil is deposited there. This deep dredge collection, in 1995, occurred at the sediment and bivalve site established in 1994.

#### **BIVALVE COLLECTIONS**

1995 Epibenthic dredge collection.

1996 No collection.

1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge

Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 15 m

sediments, 15 m

**SITE - ROCHESTER, LAKE ONTARIO, NY**

**SITE CODE - LORC**

**TARGET SPECIES - *Dreissena sp.***

**NOMINAL SITE CENTER - 43° 15.47' N**

**77° 29.72' W**

**LOCATED ON NOAA CHART - 14815 (boat ramps); 14804 (site location)**

**SITE ACCESS** - To get to the launch site travel north on Route 390, from Rochester, and then travel east on either Route 18 or on the Lake Ontario State Parkway. These two roads intersect at Lake Ave. Turn left on Lake Ave. and travel north toward the Ontario Beach Park. Boat ramps exist immediately before the bathing and picnicking facilities.

**SITE DESCRIPTION** - The site is located in 50 ft of water and mussels were collected with an epibenthic dredge. The site is just to the east of Irondequoit Bay. Water depth increases rapidly from the shore. Samples from shallower depths consisted of mud, broken shells, and small zebra mussels.

#### **BIVALVE COLLECTIONS**

1995 Epibenthic dredge collection.

1996 No collection.

1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - Epibenthic dredge collection

Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH - 15 m**

**SITE** - OSWEGO, LAKE ONTARIO, NY

**SITE CODE** - LOOS

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 43° 27.17' N

76° 33.05' W

**SEDIMENTS** - 43° 27.3' N

76° 35.4' W

**LOCATED ON NOAA CHART** - 14813 (boat ramps and bivalve site); 14803 (sediment site)

**SITE ACCESS** - Entering Oswego from the west on Route 104 (W. Seneca St.) make a left (north) turn onto West Fourth St. and proceed down the hill into Wrights Landing Marina. Boat ramps are located there.

**SITE DESCRIPTION** - After exiting the harbor entrance head West. The site is about 1 nm to the west and is located in 3 - 4 m of water, off the campus of the State University of New York. Mussels are attached to rocks. The site can be directly accessed from the campus.

The area around Oswego is rocky with a rapid increase in depth. Sand and mud sediments were located to the southwest of the bivalve site off of Ford Shoals, in approximately 19 m of water.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling  
Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - mussels, 3-4 m  
sediments, 19 m

**SITE** - CAPE VINCENT, LAKE ONTARIO, NY

**SITE CODE** - LOCV

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 44° 08.65' N

76° 19.48' W

**LOCATED ON NOAA CHART** - 14768, 14767

**SITE ACCESS** - From Watertown, NY travel Route 12E to Cape Vincent. The boat was launched from a public boat ramp located off of Route 12E, northeast of Cape Vincent approximately 1 mi.

**SITE DESCRIPTION** - Zebra mussels were found to the northeast of the town of Cape Vincent and were abundant and in association with unionid clams. The collection occurred in the Feather Bed Shoal area. The mussels found here were the largest of any found at the Great Lakes sites.

Fine grain sediments were difficult to obtain because the strong current and numerous zebra mussels prevented the jaws of the PONAR from closing properly. The chart indicated where mud could be found, unfortunately the indicated locations did not provide fine grained sediments. Much of the sediments collected were collected near buoy G"241". The same buoy that was the center of the mussel dredging operations.

#### **BIVALVE COLLECTIONS**

1995 Epibenthic dredge collection.

1996 No collection.

1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 No collection.

1996 No collection.

1997 No collection.

#### **SAMPLING METHODS**

Mussels - boat, epibenthic dredge

Sediments - PONAR grab and Kynar coated scoop

**WATER DEPTH** - 3 m

**SITE** - CRUGER ISLAND, HUDSON RIVER, NY

**SITE CODE** - HRCI

**TARGET SPECIES** - *Dreissena sp.*

**NOMINAL SITE CENTER** - 42° 02.03' N

73° 55.76' W

**LOCATED ON NOAA CHART** - 12347

**SITE ACCESS** - From Watertown, travel Interstate 81 south to Syracuse. From Syracuse travel east on the New York thruway (Interstate 90) to Albany and continue south to Kingston on Interstate 87. Take Exit 19. Go around the traffic circle, then through a light, toward the Kingston Rhinecliff Bridge. After crossing the Bridge turn left on Route 9. Turn left (north) onto Route 9G where it intersects with Route 9. Follow Route 9G north to the town of Tivoli. Travel west through Tivoli, toward the Hudson River on CR 78. A small boat may be launched at a point where a gravel road crosses the train tracks. The railroad tracks run along the bank of the river.

**SITE DESCRIPTION** - Zebra mussels were found on the northwest part of Cruger Island, adjacent to the Tivoli Bay National Estuarine Research Reserve. The samples were taken near navigational aid FI 2.5s 28 ft 4M "86".

Sediments were collected near the same navigation aid as the zebra mussel samples though the fine grained sediments were found in a shallow embayment on the north side of Cruger Island.

#### **BIVALVE COLLECTIONS**

1995 Snorkeling collection.  
1996 No collection.  
1997 Anticipated collection.

#### **SEDIMENT COLLECTIONS**

1995 Hand held petite PONAR grab.  
1996 No collection.  
1997 No collection.

#### **SAMPLING METHODS**

Mussels - snorkeling  
Sediments - boat, Hand held petite PONAR and Kynar coated scoop

**WATER DEPTH** - mussels, subtidal, 3 m  
sediments, 1.5 m



Appendix B

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>△</sup>
PBPI	Penobscot Bay	Pickering Island	ME	44° 15.89'	68° 44.02'	ME
PBSI	Penobscot Bay	Sears Island	ME	44° 27.40'	68° 52.99'	ME
MSSP	Merriconeag Sound	Stover Point	ME	43° 45.47'	69° 59.86'	ME
CAKP	Cape Arundel	Kennebunkport	ME	43° 20.72'	70° 28.46'	ME
GBDP	Great Bay	Dover Point	NH	43° 07.24'	70° 49.59'	ME
CAGH	Cape Ann	Gap Head	MA	42° 39.46'	70° 35.84'	ME
SHFP	Salem Harbor	Folger Point	MA	42° 30.81'	70° 50.65'	ME
MBNB	Massachusetts Bay	Nahant Bay	MA	42° 25.19'	70° 54.43'	ME
BHDI	Boston Harbor	Deer Island	MA	42° 21.44'	70° 58.38'	ME
BHDB	Boston Harbor	Dorchester Bay	MA	42° 18.13'	71° 02.18'	ME
BHHB	Boston Harbor	Hingham Bay	MA	42° 16.56'	70° 53.00'	ME
BHBI	Boston Harbor	Brewster Island	MA	42° 20.59'	70° 52.70'	ME
MBNR	Massachusetts Bay	North River	MA	42° 09.62'	70° 44.55'	ME
DBCI	Duxbury Bay	Clarks Island	MA	42° 00.82'	70° 38.19'	ME
CCNH	Cape Cod	Nauset Harbor	MA	41° 47.75'	69° 56.77'	ME
BBCC	Buzzards Bay	Cape Cod Canal	MA	41° 44.41'	70° 36.94'	ME
BBWF	Buzzards Bay	West Falmouth	MA	41° 36.40'	70° 39.17'	ME
BBNI	Buzzards Bay	Naushon Island	MA	41° 30.85'	70° 44.38'	ME
BBGN	Buzzards Bay	Goosebury Neck	MA	41° 28.90'	71° 02.24'	ME
BBRH	Buzzards Bay	Round Hill	MA	41° 32.38'	70° 55.70'	ME
BBAR	Buzzards Bay	Angelica Rock	MA	41° 34.78'	70° 51.54'	ME
BBAP	Buzzards Bay	Angelica Point	MA	41° 38.52'	70° 45.88'	ME
NBMH	Narragansett Bay	Mount Hope Bay	RI	41° 40.60'	71° 13.57'	SED
NBDI	Narragansett Bay	Dyer Island	RI	41° 36.29'	71° 18.31'	ME
NBPI	Narragansett Bay	Patience Island	RI	41° 39.19'	71° 21.35'	ME
NBDU	Narragansett Bay	Dutch Island	RI	41° 29.47'	71° 24.01'	ME
BIBI	Block Island Sound	Block Island	RI	41° 11.89'	71° 35.53'	ME
LICR	Long Island Sound	Connecticut River	CT	41° 16.0'	72° 20.50'	ME
LINH	Long Island Sound	New Haven	CT	41° 15.25'	72° 56.36'	ME
LIHR	Long Island Sound	Housatonic River	CT	41° 10.04'	73° 06.50'	ME
LISI	Long Island Sound	Sheffield Island	CT	41° 03.16'	73° 25.04'	ME
LIMR	Long Island Sound	Mamaroneck	NY	40° 56.51'	73° 42.19'	ME
LITN	Long Island Sound	Throgs Neck	NY	40° 49.00'	73° 47.90'	ME
LIHH	Long Island Sound	Hempstead Harbor	NY	40° 51.35'	73° 40.52'	ME
LIHU	Long Island Sound	Huntington Harbor	NY	40° 55.32'	73° 25.71'	ME
LIPJ	Long Island Sound	Port Jefferson	NY	40° 57.44'	73° 05.62'	ME
LIGB	Long Island	Gardiners Bay	NY	40° 59.89'	72° 06.97'	ME
MBTH	Moriches Bay	Tuthill Point	NY	40° 46.60'	72° 45.35'	ME
LIFI	Long Island	Fire Island Inlet	NY	40° 37.51'	73° 16.77'	ME
LIJI	Long Island	Jones Inlet	NY	40° 35.73'	73° 35.20'	ME
HRJB	Hudson/Raritan Estuary	Jamaica Bay	NY	40° 34.00'	73° 53.72'	ME
HRUB	Hudson/Raritan Estuary	Upper Bay	NY	40° 41.36'	74° 02.59'	ME
HRLB	Hudson/Raritan Estuary	Lower Bay	NY	40° 33.96'	74° 03.05'	ME
HRRB	Hudson/Raritan Estuary	Raritan Bay	NY	40° 31.14'	74° 11.07'	ME
NYSH	New York Bight	Sandy Hook	NJ	40° 29.25'	74° 02.00'	ME
NYLB	New York Bight	Long Branch	NJ	40° 17.69'	73° 58.72'	ME
NYSR	New York Bight	Shark River	NJ	40° 11.22'	74° 00.54'	ME
BIBL	Barnegat Inlet	Barnegat Light	NJ	39° 45.70'	74° 05.70'	ME
AIAC	Absecon Inlet	Atlantic City	NJ	39° 22.03'	74° 24.67'	ME
DBCM	Delaware Bay	Cape May	NJ	38° 58.93'	74° 57.68'	ME
DBFE	Delaware Bay	False Egg Island Point	NJ	39° 12.70'	75° 11.50'	CV
DBBD	Delaware Bay	Ben Davis Pt. Shoal	NJ	39° 15.14'	75° 18.17'	CV

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>△</sup>
DBAP	Delaware Bay	Arnolds Point Shoal	NJ	39° 23.00'	75° 27.00'	CV
DBHC	Delaware Bay	Hope Creek	NJ	39° 25.60'	75° 29.60'	CV
DBKI	Delaware Bay	Kelly Island	DE	39° 12.19'	75° 21.54'	CV
DBWB	Delaware Bay	Woodland Beach	DE	39° 19.92'	75° 27.42'	CV
DBCH	Delaware Bay	Cape Henlopen	DE	38° 47.01'	75° 07.23'	ME
CBBO	Chesapeake Bay	Bodkin Point	MD	39° 09.44'	76° 24.29'	CV
CBMP	Chesapeake Bay	Mountain Point Bar	MD	39° 04.32'	76° 24.76'	CV
CBHP	Chesapeake Bay	Hackett Point Bar	MD	38° 58.17'	76° 24.88'	CV
CBCP	Chesapeake Bay	Choptank River	MD	38° 36.44'	76° 07.20'	CV
CBHG	Chesapeake Bay	Hog Point	MD	38° 18.74'	76° 23.87'	CV
PRSP	Potomac River	Swan Point	MD	38° 16.90'	76° 56.02'	CV
PRMC	Potomac River	Mattox Creek	VA	38° 13.40'	76° 57.69'	CV
PRRP	Potomac River	Ragged Point	VA	38° 09.30'	76° 36.05'	CV
CBIB	Chesapeake Bay	Ingram Bay	VA	37° 47.63'	76° 17.06'	CV
RRRR	Rappahannock River	Ross Rock	VA	37° 54.12'	76° 47.27'	CV
CBDP	Chesapeake Bay	Dandy Point	VA	37° 05.90'	76° 17.69'	CV
CBJR	Chesapeake Bay	James River	VA	37° 03.92'	76° 37.93'	CV
CBCC	Chesapeake Bay	Cape Charles	VA	37° 17.07'	76° 00.92'	CV
QIUB	Quinby Inlet	Upshur Bay	VA	37° 31.50'	75° 42.83'	CV
CBCI	Chincoteague Bay	Chincoteague Inlet	VA	37° 56.31'	75° 22.55'	CV
RSJC	Roanoke Sound	John Creek	NC	35° 53.39'	75° 38.02'	CV
PSCH	Pamlico Sound	Cape Hatteras	NC	35° 12.17'	75° 42.97'	CV
PSWB	Pamlico Sound	Wysocking Bay	NC	35° 24.74'	76° 02.38'	CV
PSPR	Pamlico Sound	Pungo River	NC	35° 17.76'	76° 26.35'	CV
PSNR	Pamlico Sound	Neuse River	NC	35° 05.38'	76° 31.74'	CV
BIPI	Beaufort Inlet	Pivers Island	NC	34° 43.10'	76° 40.53'	CV
CFBI	Cape Fear	Battery Island	NC	33° 54.95'	78° 00.21'	CV
WBLB	Winyah Bay	Lower Bay	SC	33° 14.60'	79° 11.83'	CV
SRNB	Santee River	North Bay	SC	33° 10.10'	79° 14.50'	CV
CHFJ	Charleston Harbor	Fort Johnson	SC	32° 45.03'	79° 54.02'	CV
CHSF	Charleston Harbor	Shutes Folly Island	SC	32° 46.41'	79° 54.73'	CV
SRTI	Savannah River Estuary	Tybee Island	GA	32° 00.99'	80° 52.95'	CV
SSSI	Sapelo Sound	Sapelo Island	GA	31° 23.57'	81° 17.28'	CV
ARWI	Altamaha River	Wolfe Island	GA	31° 19.45'	81° 18.65'	CV
SJCB	St. Johns River	Chicopit Bay	FL	30° 22.86'	81° 26.40'	CV
MRCB	Matanzas River	Crescent Beach	FL	29° 45.84'	81° 15.71'	CV
IRSR	Indian River	Sebastian River	FL	27° 49.77'	80° 28.46'	CV
NMML	North Miami	Maule Lake	FL	25° 56.26'	80° 08.98'	CV
BBGC	Biscayne Bay	Gould's Canal	FL	25° 32.00'	80° 19.39'	CV
BBPC	Biscayne Bay	Princeton Canal	FL	25° 31.13'	80° 19.75'	CV
PRBB	Puerto Rico	Bahia de Boqueron	PR	18° 00.47'	67° 10.51'	CR
PRBM	Puerto Rico	Bahia Montalva	PR	17° 58.26'	66° 59.37'	CR
PRBJ	Puerto Rico	Bahia de Jobos	PR	17° 56.35'	66° 10.88'	CR
BHKF	Florida Keys	Bahia Honda	FL	24° 39.67'	81° 16.38'	CS
FBJB	Florida Bay	Joe Bay	FL	25° 12.73'	80° 32.04'	CV
FBFO	Florida Bay	Flamingo	FL	25° 08.47'	80° 55.42'	CV
EVFU	Everglades	Faka Union Bay	FL	25° 54.14'	81° 30.74'	CV
RBHC	Rookery Bay	Henderson Creek	FL	26° 01.62'	81° 44.33'	CV
NBNB	Naples Bay	Naples Bay	FL	26° 06.71'	81° 47.11'	CV
CBBI	Charlotte Harbor	Bird Island	FL	26° 30.86'	82° 02.07'	CV
CBFM	Charlotte Harbor	Fort Meyers	FL	26° 33.50'	81° 55.37'	CV
TBCB	Tampa Bay	Cockroach Bay	FL	27° 40.86'	82° 31.06'	CV
TBHB	Tampa Bay	Hillsborough Bay	FL	27° 51.29'	82° 23.68'	CV
TBKA	Tampa Bay	Peter O. Knight Airport	FL	27° 54.58'	82° 27.23'	CV
TBOT	Tampa Bay	Old Tampa Bay	FL	28° 01.42'	82° 37.97'	CV
TBPB	Tampa Bay	Papys Bayou	FL	27° 50.66'	82° 36.69'	CV
TBMK	Tampa Bay	Mullet Key Bayou	FL	27° 37.25'	82° 43.59'	CV

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>△</sup>
TBNP	Tampa Bay	Navarez Park	FL	27° 47.23'	82° 45.24'	CV
CKBP	Cedar Key	Black Point	FL	29° 12.40'	83° 04.17'	CV
SRWP	Suwannee River	West Pass	FL	29° 19.75'	83° 10.45'	CV
AESP	Apalachee Bay	Spring Creek	FL	30° 03.80'	84° 19.32'	CV
APCP	Apalachicola Bay	Cat Point Bar	FL	29° 43.45'	84° 53.05'	CV
APDB	Apalachicola Bay	Dry Bar	FL	29° 40.35'	85° 03.94'	CV
SAWB	St. Andrew Bay	Watson Bayou	FL	30° 08.55'	85° 37.93'	CV
PCMP	Panama City	Municipal Pier	FL	30° 09.07'	85° 39.78'	CV
PCLO	Panama City	Little Oyster Bar	FL	30° 15.08'	85° 40.86'	CV
CBSR	Choctawhatchee Bay	Off Santa Rosa	FL	30° 24.72'	86° 12.22'	CV
CBJB	Choctawhatchee Bay	Joe's Bayou	FL	30° 24.65'	86° 29.45'	CV
CBBL	Choctawhatchee Bay	Ben's Lake	FL	30° 27.19'	86° 32.46'	CV
CBPP	Choctawhatchee Bay	Postil Point	FL	30° 28.94'	86° 28.76'	CV
CBBB	Choctawhatchee Bay	Boggy Bayou	FL	30° 30.24'	86° 29.64'	CV
PBSP	Pensacola Bay	Sabine Point	FL	30° 20.99'	87° 09.28'	CV
PBIB	Pensacola Bay	Indian Bayou	FL	30° 31.00'	87° 06.70'	CV
PBPH	Pensacola Bay	Public Harbor	FL	30° 24.82'	87° 11.48'	CV
MBDR	Mobile Bay	Dog River	AL	30° 35.50'	88° 02.39'	CV
MBHI	Mobile Bay	Hollingers Is. Chan.	AL	30° 33.80'	88° 04.50'	CV
MBCP	Mobile Bay	Cedar Point Reef	AL	30° 18.93'	88° 08.03'	CV
MSPB	Mississippi Sound	Pascagoula Bay	MS	30° 20.16'	88° 35.35'	CV
MSBB	Mississippi Sound	Biloxi Bay	MS	30° 23.55'	88° 51.45'	CV
MSPC	Mississippi Sound	Pass Christian	MS	30° 18.14'	89° 19.63'	CV
LPNO*	Lake Pontchartrain	New Orleans	LA	30° 02.18'	90° 02.48'	CV
LBGO**	Lake Borgne	Gulf Outlet	LA	29° 56.69'	89° 50.12'	CV
LBMP	Lake Borgne	Malheureux Point	LA	29° 52.02'	89° 40.71'	CV
BBSG	Breton Sound	Bay Gardene	LA	29° 35.88'	89° 37.25'	CV
BSSI	Breton Sound	Sable Island	LA	29° 24.34'	89° 29.03'	CV
MRPL	Mississippi River	Pass A Loutre	LA	29° 05.37'	89° 04.49'	CV
MRTP	Mississippi River	Tiger Pass	LA	29° 08.70'	89° 25.64'	CV
BBMB	Barataria Bay	Middle Bank	LA	29° 16.60'	89° 56.52'	CV
BBSD	Barataria Bay	Bayou Saint Denis	LA	29° 24.29'	89° 59.93'	CV
BBTB	Barataria Bay	Turtle Bay	LA	29° 30.67'	90° 05.00'	CV
TBLF	Terrebonne Bay	Lake Felicity	LA	29° 15.85'	90° 23.89'	CV
TBLB	Terrebonne Bay	Lake Barre	LA	29° 15.57'	90° 35.66'	CV
CLCL	Caillou Lake	Caillou Lake	LA	29° 15.19'	90° 55.60'	CV
ABOB	Atchafalaya Bay	Oyster Bayou	LA	29° 15.33'	91° 08.17'	CV
ECSP	East Cote Blanche	South Point	LA	29° 28.50'	91° 48.00'	CV
VBSP	Vermilion Bay	Southwest Pass	LA	29° 34.77'	92° 03.06'	CV
JHJH	Joseph Harbor Bayou	Joseph Harbor Bayou	LA	29° 38.21'	92° 46.01'	CV
CLLC	Calcasieu Lake	Lake Charles	LA	30° 03.52'	93° 18.45'	CV
CLSJ	Calcasieu Lake	St. Johns Island	LA	29° 49.74'	93° 23.04'	CV
SLBB	Sabine Lake	Blue Buck Point	LA	29° 47.45'	93° 54.38'	CV
GBHR	Galveston Bay	Hanna Reef	TX	29° 28.82'	94° 44.51'	CV
GBSC	Galveston Bay	Ship Channel	TX	29° 42.27'	94° 59.58'	CV
GBYC	Galveston Bay	Yacht Club	TX	29° 37.32'	94° 59.75'	CV
GBTD	Galveston Bay	Todd's Dump	TX	29° 30.18'	94° 53.76'	CV
GBOB	Galveston Bay	Offatts Bayou	TX	29° 17.04'	94° 50.18'	CV
GBOR	Galveston Bay	Confederate Reef	TX	29° 15.80'	94° 54.98'	CV
BRFS	Brazos River	Freeport Surfside	TX	28° 55.27'	95° 20.37'	CV
BRCL	Brazos River	Cedar Lakes	TX	28° 51.48'	95° 27.88'	CV
MBEM	Matagorda Bay	East Matagorda	TX	28° 42.67'	95° 53.00'	CV
MBDI	Matagorda Bay	Dog Island	TX	28° 38.42'	96° 00.47'	CV
MBTP	Matagorda Bay	Tres Palacios Bay	TX	28° 39.98'	96° 14.01'	CV
MBCB	Matagorda Bay	Carancahua Bay	TX	28° 39.90'	96° 22.98'	CV
MBLR	Matagorda Bay	Lavaca River Mouth	TX	28° 39.62'	96° 35.07'	CV
MBGP	Matagorda Bay	Gallinipper Point	TX	28° 34.73'	96° 33.78'	CV

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>△</sup>
ESBD	Espiritu Santo	Bill Days Reef	TX	28° 24.71'	96° 26.94'	CV
ESSP	Espiritu Santo	South Pass Reef	TX	28° 17.89'	96° 37.32'	CV
SAMP	San Antonio Bay	Mosquito Point	TX	28° 20.64'	96° 42.74'	CV
SAPP	San Antonio Bay	Panther Point Reef	TX	28° 13.94'	96° 42.49'	CV
MBAR	Mesquite Bay	Ayres Reef	TX	28° 10.38'	96° 50.10'	CV
ABLR	Aransas Bay	Long Reef	TX	28° 03.29'	96° 57.07'	CV
CBCR	Copano Bay	Copano Reef	TX	28° 08.52'	97° 07.68'	CV
ABHI	Aransas Bay	Harbor Island	TX	27° 50.33'	97° 04.52'	CV
CCIC	Corpus Christi	Ingleside Cove	TX	27° 50.28'	97° 14.28'	CV
CCNB	Corpus Christi	Nueces Bay	TX	27° 51.13'	97° 21.59'	CV
CCBH	Corpus Christi	Boat Harbor	TX	27° 50.17'	97° 22.81'	CV
LMAC	Lower Laguna Madre	Arroyo Colorado	TX	26° 16.95'	97° 17.12'	CV
LMPI	Lower Laguna Madre	Port Isabel	TX	26° 04.49'	97° 11.97'	CV
LMSB	Lower Laguna Madre	South Bay	TX	26° 02.59'	97° 10.56'	CV
IBNJ	Imperial Beach	North Jetty	CA	32° 35.26'	117° 08.01'	MC
SDCB	San Diego Bay	Coronado Bridge	CA	32° 41.19'	117° 09.55'	ME
PLLH	Point Loma	Lighthouse	CA	32° 40.83'	117° 14.93'	MC
SDHI	San Diego Bay	Harbor Island	CA	32° 43.48'	117° 11.68'	ME
MBVB	Mission Bay	Ventura Bridge	CA	32° 46.05'	117° 14.52'	ME
LJLJ	La Jolla	Point La Jolla	CA	32° 51.09'	117° 16.43'	MC
OSBJ	Oceanside	Municipal Beach Jetty	CA	33° 12.10'	117° 23.62'	MC/ ME
NBWJ	Newport Beach	West Jetty	CA	33° 35.46'	117° 53.40'	MC
SCBR	South Catalina Island	Bird Rock	CA	33° 27.10'	118° 29.24'	MC
ABWJ	Anaheim Bay	West Jetty	CA	33° 44.01'	118° 06.06'	MC
LBBW	Long Beach	Breakwater	CA	33° 43.39'	118° 10.41'	ME
SPFP	San Pedro Harbor	Fishing Pier	CA	33° 42.40'	118° 16.45'	ME
PVRP	Palos Verdes	Royal Palms State Pk.	CA	33° 43.02'	118° 19.36'	MC
RBMJ	Redondo Beach	Municipal Jetty	CA	33° 49.92'	118° 23.57'	MC
MDSJ	Marina Del Rey	South Jetty	CA	33° 57.71'	118° 27.48'	ME
TBSM	Las Tunas Beach	Santa Monica Bay	CA	34° 02.34'	118° 35.83'	MC
PDPD	Point Dume	Point Dume	CA	34° 00.06'	118° 48.53'	MC
SCFP	Santa Cruz Island	Fraser Point	CA	34° 03.48'	119° 55.22'	MC
SANM	San Miguel Island	Tyler Bight	CA	34° 01.68'	120° 25.16'	MC
SBSB	Point Santa Barbara	Point Santa Barbara	CA	34° 23.74'	119° 43.65'	MC
PCPC	Point Conception	Point Conception	CA	34° 26.63'	120° 27.42'	MC
SLSL	San Luis Obispo Bay	Point San Luis	CA	35° 09.63'	120° 45.35'	MC
SSSS	San Simeon Point	San Simeon Point	CA	35° 38.08'	121° 11.68'	MC
PGLP	Pacific Grove	Lovers Point	CA	36° 37.63'	121° 54.99'	MC
MBML	Monterey Bay	Moss Landing	CA	36° 48.07'	121° 47.38'	MC
MBES	Monterey Bay	Elkhorn Slough	CA	36° 48.59'	121° 47.11'	MC
MBSC	Monterey Bay	Point Santa Cruz	CA	36° 57.25'	122° 01.48'	MC
FIEL	Farallon Islands	East Landing	CA	37° 41.77'	122° 59.99'	MC
SFDB	San Francisco Bay	Dumbarton Bridge	CA	37° 30.16'	122° 07.28'	ME
SFSM	San Francisco Bay	San Mateo Bridge	CA	37° 34.68'	122° 15.22'	ME
SFEM	San Francisco Bay	Emeryville	CA	37° 49.23'	122° 19.80'	ME
SPSM	San Pablo Bay	Semple Point	CA	38° 04.20'	122° 14.33'	SED
SPSP	San Pablo Bay	Point San Pedro	CA	38° 01.35'	122° 25.53'	SED
TBSR	Tomales Bay	Spenger's Residence	CA	38° 08.97'	122° 54.24'	ME
BBBE	Bodega Bay	Bodega Bay Entrance	CA	38° 18.30'	123° 03.96'	MC
PALH	Point Arena	Lighthouse	CA	38° 57.18'	123° 44.58'	MC
PDSC	Point Delgada	Shelter Cove	CA	40° 01.35'	124° 04.40'	MC
HMBJ	Eureka	Humboldt Bay Jetty	CA	40° 45.85'	124° 14.25'	MC
EUSB	Eureka	Samoa Bridge	CA	40° 49.29'	124° 10.28'	MC
KRFR	Klamath River	Flint Rock Head	CA	41° 31.63'	124° 04.78'	MC
SGSG	Crescent	Point St. George	CA	41° 44.87'	124° 12.46'	MC
CBCH	Coos Bay	Coos Head	OR	43° 21.00'	124° 19.85'	MC
CBRP	Coos Bay	Russell Point	OR	43° 25.88'	124° 13.27'	ME

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>△</sup>
YBOP	Yaquina Bay	Oneatta Point	OR	44° 34.51'	123° 59.34'	ME
YHYH	Yaquina Bay	Yaquina Head	OR	44° 40.58'	124° 04.68'	MC
YHSS	Yaquina Bay	Sally's Slough	OR	44° 36.83'	124° 00.95'	SED
YHFC	Yaquina Bay	Fogarty Creek	OR	44° 50.22'	124° 03.12'	MC
TBHP	Tillamook Bay	Hobsonville Point	OR	45° 32.83'	123° 54.45'	ME
CRSJ	Columbia River	South Jetty	OR	46° 13.72'	124° 01.39'	ME
CRYB	Columbia River	Youngs Bay	OR	46° 10.98'	123° 52.79'	SED
CRNJ	Columbia River	North Jetty	WA	46° 16.67'	124° 03.73'	ME
WBNA	Willapa Bay	Nahcotta	WA	46° 29.95'	124° 01.63'	ME
GHWJ	Gray's Harbor	Westport Jetty	WA	46° 54.58'	124° 07.06'	MC
JFCF	Strait of Juan de Fuca	Cape Flattery	WA	48° 22.95'	124° 43.68'	MC
JFNB	Strait of Juan de Fuca	Neah Bay	WA	48° 22.46'	124° 36.96'	SED
PSPA	Puget Sound	Port Angeles	WA	48° 08.38'	123° 25.21'	ME
PSPT	Puget Sound	Port Townsend	WA	48° 06.28'	122° 46.68'	ME
PSHC	Puget Sound	Hood Canal	WA	47° 49.91'	122° 41.30'	ME
SSBI	South Puget Sound	Budd Inlet	WA	47° 05.96'	122° 53.65'	ME
CBTP	Commencement Bay	Tahlequah Point	WA	47° 19.87'	122° 30.26'	ME
CBBP	Commencement Bay	Browns Point	WA	47° 17.59'	122° 25.99'	SED
PSSS	Puget Sound	South Seattle	WA	47° 31.40'	122° 23.62'	ME
SIWP	Sinclair Inlet	Waterman Point	WA	47° 35.11'	122° 34.25'	ME
EBDH	Elliott Bay	Duwamish Head	WA	47° 35.75'	122° 23.20'	ME
EBFR	Elliott Bay	Four-Mile Rock	WA	47° 38.33'	122° 24.83'	ME
WIPP	Whidbey Island	Possession Point	WA	47° 54.32'	122° 22.62'	ME
PSEH	Puget Sound	Everett Harbor	WA	47° 58.36'	122° 13.82'	ME
BBSM	Bellingham Bay	Squalicum Marina Jet.	WA	48° 45.13'	122° 29.87'	ME
PRPR	Point Roberts	Point Roberts	WA	48° 59.42'	123° 05.30'	ME
KTMP	Ketchikan	Mountain Point	AK	55° 17.63'	131° 32.88	ME
NBES	Nahku Bay	East Side	AK	59° 27.20'	135° 20.19'	ME
PWSH	Prince William Sound	Sheep Bay	AK	60° 38.44'	145° 59.40'	ME
PWKH	Prince William Sound	Knowles Head	AK	60° 41.28'	146° 35.01'	ME
PVMC	Port Valdez	Mineral Creek Flats	AK	61° 07.97'	146° 27.66'	ME
UISB	Unakwit Inlet	Siwash Bay	AK	60° 57.65'	147° 38.76'	ME
PWDI	Prince William Sound	Disk Island	AK	60° 29.58'	147° 39.35'	ME
GASL	Prince William Sound	Sleepy Bay	AK	60° 04.04'	147° 49.53'	ME
GAWB	Gulf of Alaska	Windy Bay	AK	59° 13.12'	151° 31.02'	ME
CIHS	Cook Inlet	Homer Spit	AK	59° 36.87'	151° 26.65'	ME
GASH	Gulf of Alaska	Shuyak Harbor	AK	58° 30.06'	152° 37.31'	ME
BPBP	Barber's Point	Barber's Pt. Harbor	HI	21° 19.22'	158° 07.18'	OS
HHKL	Honolulu Hrb.	Keehi Lagoon	HI	21° 19.00'	157° 53.15'	OS
HHKB	Hawaii	Kaneohe Bay	HI	21° 24.71'	157° 46.73'	OS
KAUI	Kauai	Nawiliwili Harbor	HI	21° 57.40'	159° 21.35'	OS
GBBS	Green Bay	Bayshore Park	WI	44° 38.22'	87° 48.49'	DS
LMMB	Lake Michigan	Milwaukee Bay	WI	43° 01.93'	87° 53.71'	DS
LMNC	Lake Michigan	North Chicago	IL	42° 18.28'	87° 49.64'	DS
LMCB	Lake Michigan	Calumet Breakwater	IN	41° 43.63'	87° 29.70'	DS
LMHB	Lake Michigan	Holland Breakwater	MI	42° 46.39'	86° 12.90'	DS
LMMU	Lake Michigan	Muskegon	MI	43° 13.55'	86° 20.82'	DS
TBLL	Traverse Bay	Leelanau State Park	MI	45° 12.34'	85° 32.21'	DS
LHTB	Lake Huron	Thunder Bay	MI	44° 55.33'	83° 24.81'	DS
SBSP	Saginaw Bay	Sandpoint	MI	43° 54.59'	83° 24.01'	DS
SBSR	Saginaw Bay	Saginaw River	MI	43° 40.41'	83° 50.20'	DS
LHBR	Lake Huron	Black River Canal	MI	43° 02.66'	82° 26.32'	DS
LSAB	Lake St. Clair	Anchor Bay	MI	42° 38.95'	82° 42.66'	DS
LESP	Lake Erie	Stony Point	MI	41° 57.52'	83° 13.98'	DS
LERB	Lake Erie	Reno Beach	OH	41° 40.47'	83° 13.57'	DS
SBPP	Lake Erie	Peach Orchard Pt.	OH	41° 39.58'	82° 49.50'	DS
LEOW	Lake Erie	Old Woman Creek	OH	41° 23.10'	82° 31.12'	DS

Table B.1. Mussel Watch Project site codes, names, locations and sample matrices.

Site code <sup>◇</sup>	Site name	Site location	State	Latitude (N)	Longitude (W)	Matrix <sup>Δ</sup>
LELR	Lake Erie	Lorain	OH	41° 27.67'	82° 12.42'	DS
LEAB	Lake Erie	Ashtabula	OH	41° 55.48'	80° 43.10'	DS
LEDK	Lake Erie	Dunkirk	NY	42° 31.75'	79° 16.66'	DS
NRNF	Niagara River	Niagara Falls	NY	43° 02.81'	78° 53.52'	DS
LOOC	Lake Ontario	Olcott	NY	43° 21.32'	78° 41.20'	DS
LORC	Lake Ontario	Rochester	NY	43° 15.47'	77° 29.72'	DS
LOOS	Lake Ontario	Oswego	NY	43° 27.17'	76° 33.05'	DS
LOCV	Lake Ontario	Cape Vincent	NY	44° 08.65'	76° 19.48'	DS
HRCI	Hudson River	Cruger Island	NY	42° 02.03'	73° 55.76'	DS

<sup>◇</sup> Site acronym and name changes are shown for changes that have occurred since 1992. Earlier changes can be found in NOAA Tech. Memo. NOS ORCA 70.

<sup>Δ</sup> SED - Sediment site location. Species: ME - *Mytilus edulis*, MC - *Mytilus californianus*, CV - *Crassostrea virginica*, CR - *Crassostrea rhizophorae*, CS - *Chama sinuosa*, OS - *Ostrea sandvicensis*, DS- *Dreissena* species. (Primary species collected; a secondary species was collected at some sites for comparison purposes, early in the project.)

\* Old site code is LPGO.

\*\* Old site code is LBNO.

Table B.2. Mussel Watch Project tissue sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
PBPI	Penobscot Bay	Pickering Island	ME	x	x	x	x	x	x	x			x		x
PBSI	Penobscot Bay	Sears Island	ME	x	x	x	x	x	x	x	x	x	x		x
MSSP	Merriconeag Sound	Stover Point	ME			x	x	x	x	x	x	x	x		x
CAKP	Cape Arundel	Kennebunkport	ME				x	x	x	x			x		x
GBDP	Dover Point	Great Bay	NH												x
CAGH	Cape Ann	Gap Head	MA		x	x	x	x	x	x	x	x	x		x
SHFP	Salem Harbor	Folger Point	MA			x	x	x	x	x			x		x
MBNB	Salem Harbor	Nahant Bay	MA					x			x	x	x		x
BHDI	Boston Harbor	Deer Island	MA	x	x	x	x	x	x	x			x		x
BHDB	Boston Harbor	Dorchester Bay	MA	x	x	x	x	x			x	x	x		x
BHHB	Boston Harbor	Hingham Bay	MA	x	x	x	x	x	x	x			x		x
BHBI	Boston Harbor	Brewster Island	MA	x	x	x	x	x	x	x	x	x	x		x
MBNR	Massachusetts Bay	North River	MA					x			x		x		x
DBCI	Duxbury Bay	Clarks Island	MA				x	x	x	x	x	x	x		x
CCNH	Cape Cod	Nauset Harbor	MA				x	x	x	x			x		x
BBCC	Buzzards Bay	Cape Cod Canal	MA				x	x	x			x			x
BBWF	Buzzards Bay	West Falmouth	MA					x	x	x		x			x
BBNI	Buzzards Bay	Naushon Island	MA					x	x	x		x			x
BBGN	Buzzards Bay	Goosebury Neck	MA	x	x	x	x	x	x	x		x			x
BBRH	Buzzards Bay	Round Hill	MA	x	x	x	x	x				x			x
BBAR	Buzzards Bay	Angelica Rock	MA	x	x	x	x	x	x	x	x	x			x
BBAP	Buzzards Bay	Angelica Point	MA												x
NBDI	Narragansett Bay	Dyer Island	RI	x	x	x	x	x			x	x	x		x
NBPI	Narragansett Bay	Patience Island	RI				x	x	x	x			x		x
NBDU	Narragansett Bay	Dutch Island	RI	x	x		x		x	x	x	x	x		x
BIBI	Block Island	Block Island	RI		x	x	x	x	x	x			x		x
LICR	Long Is. Sound	Connecticut River	CT	x	x	x	x	x	x	x		x			x
LINH	Long Is. Sound	New Haven	CT	x	x	x	x	x	x	x	x	x			x
LIHR	Long Is. Sound	Housatonic River	CT	x	x	x	x	x	x	x		x			x
LISI	Long Is. Sound	Sheffield Island	CT	x	x	x	x	x			x	x			x
LIMR	Long Is. Sound	Mamaroneck River	NY	x	x	x	x	x	x	x		x			x
LITN	Long Is. Sound	Throgs Neck	NY	x	x	x	x	x	x	x	x	x			x
LIHH	Long Is. Sound	Hempstead Harbor	NY	x	x	x	x	x	x	x	x	x			x
LIHU	Long Is. Sound	Huntington Harbor	NY	x	x	x	x	x	x	x		x			x
LIPJ	Long Is. Sound	Port Jefferson	NY	x	x	x	x	x	x	x	x	x			x
LIGB	Long Island	Gardiners Bay	NY				x	x	x	x	x				x
MBTH	Moriches Bay	Tuthill Point	NY	x	x	x	x	x	x	x	x	x			x
LIFI	Long Island	Fire Island	NY					x							x
LJI	Long Island	Jones Inlet	NY								x	x			x
HRJB	Hud./Rar. Estuary	Jamaica Bay	NY	x	x	x	x	x	x	x			x		x
HRUB	Hud./Rar. Estuary	Upper Bay	NY	x	x	x	x	x	x	x		x	x		x
HRLB	Hud./Rar. Estuary	Lower Bay	NY	x	x	x	x	x			x		x		x
HRRB	Hud./Rar. Estuary	Raritan Bay	NY					x				x	x		x
NYSH	New York. Bight	Sandy Hook	NJ	x	x	x	x	x	x	x			x		x
NYLB	New York. Bight	Long Branch	NJ	x	x	x	x	x			x	x	x		x
NYSR	New York. Bight	Shark River	NJ	x	x	x	x	x	x	x	x	x	x		x
BIBL	Barnegat Inlet	Barnegat Light	NJ				x	x	x	x		x			x
AIAC	Absecon Inlet	Atlantic City	NJ				x	x	x	x		x			x
DBCM	Delaware Bay	Cape May	NJ				x	x	x	x			x		x
DBFE	Delaware Bay	False Egg Island	NJ	x	x	x		x	x	x		x			x
DBBD	Delaware Bay	Ben Davis Point	NJ	x	x	x	x	x			x		x		x
DBAP	Delaware Bay	Arnolds Point	DE	x	x	x		x	x	x		x			x
DBHC	Delaware Bay	Hope Creek	NJ				x								
DBKI	Delaware Bay	Kelly Island	DE	x	x	x	x	x	x			x			x
DBWB	Delaware Bay	Woodland Beach	DE				x								
DBCH	Delaware Bay	Cape Henlopen	MD				x	x	x	x	x		x	x	
CBBO	Chesapeake Bay	Bodkin Point	MD				x	x			x		x		x

Table B.2. Mussel Watch Project tissue sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
CBMP	Chesapeake Bay	Mountain Point	MD	x	x	x	x	x	x	x			x		x
CBHP	Chesapeake Bay	Hackett Point	MD	x	x	x	x	x	x	x		x	x		x
CBCP	Chesapeake Bay	Choptank River	MD				x	x	x	x			x		x
CBHG	Chesapeake Bay	Hog Point	MD	x	x	x	x	x	x			x			x
PRSP	Potomac River	Swan Point	MD				x	x				x			x
PRMC	Potomac River	Mattox Creek	VA					x				x	x		x
PRRP	Potomac River	Ragged Point	VA				x	x	x	x			x		x
CBIB	Chesapeake Bay	Ingram Bay	VA	x	x										
RRRR	Rappahannock	Ross Rock	VA				x	x	x	x			x		x
CBDP	Chesapeake Bay	Dandy Point	VA	x	x	x	x	x	x	x			x		x
CBJR	Chesapeake Bay	James River	VA				x	x				x	x		x
CBCC	Chesapeake Bay	Cape Charles	VA	x	x	x	x	x	x	x		x	x		x
QIUB	Quinby Inlet	Upshur Bay	VA	x	x	x	x	x	x	x		x	x		x
CBCI	Chincoteague Bay	Chincoteague Inlet	VA	x	x	x	x	x	x	x		x	x		x
RSJC	Roanoke Sound	John Creek	VA	x	x	x	x	x	x	x		x	x		x
PSCH	Pamlico Sound	Cape Hatteras	NC					x	x	x	x		x		x
PSWB	Pamlico Sound	Wysocking Bay	NC	x	x	x	x	x	x	x			x		x
PSPR	Pamlico Sound	Pungo River	NC				x	x	x	x			x		
PSNR	Pamlico Sound	Neuse River	NC				x	x	x	x			x		x
BIPI	Beaufort Inlet	Pivers Island	NC					x	x	x	x				x
CFBI	Cape Fear	Battery Island	NC	x	x	x	x	x	x	x	x		x		x
WBLB	Winyah Bay	Lower Bay	SC				x	x	x	x	x				x
SRNB	Santee River	North Bay	SC				x	x	x	x			x		x
CHFJ	Charleston Harbor	Fort Johnson	SC	x	x	x	x	x	x	x	x				x
CHSF	Charleston Harbor	Shutes Folly	SC	x	x	x	x	x	x	x		x			x
SRTI	Savannah River	Tybee Island	GA	x	x	x	x	x	x	x			x		x
SSSI	Sapelo Sound	Sapelo Island	GA	x	x	x	x	x	x	x		x	x		x
ARWI	Altamaha River	Wolfe Island	GA				x	x	x	x			x		x
SJCB	St. Johns River	Chicopit Bay	FL	x	x	x	x	x	x	x			x		x
MRCB	Matanzas River	Crescent Beach	FL	x	x	x	x	x	x	x		x	x		x
IRSR	Indian River	Sebastian River	FL				x	x	x	x			x		x
NMML	North Miami	Maule Lake	FL				x	x	x	x		x	x		x
BBGC	Biscayne Bay	Gould's Canal	FL					x	x	x	x		x		x
BBPC	Biscayne Bay	Princeton Canal	FL	x	x										
PRBB	Puerto Rico	Bahia de Boqueron	PR							x	x	x			x
PRBM	Puerto Rico	Bahia Montalva	PR							x	x	x			
PRBJ	Puerto Rico	Bahia de Jobos	PR							x	x	x			x
BHKF	Bahia Honda	Florida Keys	FL						x	x			x		x
FBJB	Florida Bay	Joe Bay	FL										x	x	x
FBFO	Florida Bay	Flamingo	FL										x	x	x
EVFU	Everglades	Faka Union Bay	FL	x	x	x	x	x	x	x			x		x
RBHC	Rookery Bay	Henderson Creek	FL	x	x	x	x	x	x	x	x				x
NBNB	Naples Bay	Naples Bay	FL	x	x	x	x	x	x	x			x		x
CBBI	Charlotte Harbor	Bird Island	FL	x	x	x	x	x	x	x	x		x		x
CBFM	Charlotte Harbor	Fort Meyers	FL				x	x	x	x	x		x		x
TBCB	Tampa Bay	Cockroach Bay	FL	x	x	x	x	x	x	x					x
TBHB	Tampa Bay	Hillsborough Bay	FL	x	x	x						x	x		x
TBKA	Tampa Bay	Peter O. Knight Airport	FL				x	x	x	x	x				x
TBOT	Tampa Bay	Old Tampa Bay	FL				x	x	x	x	x				x
TBPB	Tampa Bay	Papys Bayou	FL	x	x	x	x	x	x	x	x				x
TBMK	Tampa Bay	Mullet Key Bay	FL	x	x	x	x	x	x	x	x				x
TBNP	Tampa Bay	Navarez Park	FL				x	x	x	x	x				x
CKBP	Cedar Key	Black Point	FL	x	x	x	x	x	x	x	x		x		x
SRWP	Suwannee River	West Pass	FL				x								
AESP	Apalachee Bay	Spring Creek	FL				x	x	x	x	x		x		x
APCP	Apalachicola Bay	Cat Point Bar	FL	x	x	x	x	x	x	x			x		x
APDB	Apalachicola Bay	Dry Bar	FL	x	x	x	x	x	x	x			x		x
SAWB	St. Andrew Bay	Watson Bayou	FL	x	x	x	x	x	x	x			x		x
PCMP	Panama City	Municipal Pier	FL				x	x	x			x		x	x

Table B.2. Mussel Watch Project tissue sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
PCLO	Panama City	Little Oyster Bar	FL				x	x	x	x	x	x	x		x
CBSR	Choctawhatchee Bay	Off Santa Rosa	FL	x	x	x	x	x	x	x	x		x	x	
CBJB	Choctawhatchee Bay	Joe's Bayou	FL				x	x	x	x	x				x
CBBL	Choctawhatchee Bay	Bens Lake	FL							x	x				x
CBPP	Choctawhatchee Bay	Postil Point	FL	x	x	x	x	x	x	x	x				x
CBBB	Choctawhatchee Bay	Boggy Bayou	FL							x	x				x
PBSP	Pensacola Bay	Sabine Point	FL					x			x				x
PBIB	Pensacola Bay	Indian Bayou	FL	x	x	x	x		x	x	x				
PBPH	Pensacola Bay	Public Harbor	FL			x	x	x	x	x	x				x
MBDR	Mobile Bay	Dog River	AL					x							x
MBHI	Mobile Bay	Hollingers Island Chan.	AL			x	x	x	x	x	x				x
MBCP	Mobile Bay	Cedar Point Reef	AL	x	x	x	x	x	x	x	x				x
MSPB	Miss. Sound	Pascagoula Bay	MS	x	x	x	x	x	x	x	x				x
MSBB	Miss. Sound	Biloxi Bay	MS	x	x	x	x	x	x	x	x		x		
MSPC	Miss. Sound	Pass Christian	MS	x	x	x	x	x	x	x	x				x
LPNO	L. Pontchartrain	New Orleans	LA						x				x	x	
LBGO	Lake Borgne	Gulf Outlet	LA			x						x	x	x	
LBMP	Lake Borgne	Malheureux Point	LA	x	x	x	x	x	x	x	x		x	x	
BSEB	Breton Sound	Bay Gardene	LA	x	x	x	x	x	x	x			x	x	
BSSI	Breton Sound	Sable Island	LA	x	x	x	x	x	x	x	x				x
MRPL	Miss. River	Pass A Loutre	LA			x	x	x	x	x	x				x
MRTP	Miss. River	Tiger Pass	LA			x	x	x			x				x
BBMB	Barataria Bay	Middle Bank	LA	x	x	x	x	x	x	x			x		x
BBSD	Barataria Bay	Bayou Saint Denis	LA	x	x	x	x	x		x	x		x		x
BBTB	Barataria Bay	Turtle Bay	LA			x			x						
TBLF	Terrebonne Bay	Lake Felicity	LA	x	x	x	x	x	x	x	x				x
TBLB	Terrebonne Bay	Lake Barre	LA	x	x	x	x	x	x	x					x
CLCL	Caillou Lake	Caillou Lake	LA	x	x	x	x	x	x	x	x		x		x
ABOB	Atchafalaya	Oyster Bayou	LA	x	x	x	x	x	x	x			x		x
VBSP	Vermilion Bay	Southwest Pass	LA	x	x	x	x	x	x	x	x		x		x
JHJH	J. Hrb. Bayou	Joseph Harbor	LA	x	x	x	x	x	x	x			x		x
CLLC	Calcasieu Lake	Lake Charles	LA			x	x	x	x	x	x				x
CLSJ	Calcasieu Lake	St. Johns Island	LA	x	x	x	x	x	x	x			x		
SLBB	Sabine Lake	Blue Buck Point	TX	x	x	x	x	x	x	x	x		x		x
GBHR	Galveston Bay	Hanna Reef	TX	x	x	x	x	x	x	x			x		x
GBSC	Galveston Bay	Ship Channel	TX			x	x	x	x	x	x				
GBYC	Galveston Bay	Yacht Club	TX	x	x	x	x	x	x	x			x		x
GBTD	Galveston Bay	Todd's Dump	TX	x	x	x	x	x	x	x	x		x		x
GBOB	Galveston Bay	Offatts Bayou	TX			x	x	x	x	x	x		x		x
GBOR	Galveston Bay	Confederate Reef	TX	x	x	x	x	x	x	x			x		x
BRFS	Brazos River	Freeport Surfside	TX			x	x	x	x	x			x		x
BRCL	Brazos River	Cedar Lakes	TX				x	x	x	x	x		x		x
MBEM	Matagorda Bay	East Matagorda	TX	x	x	x	x	x	x	x			x		x
MBDI	Matagorda Bay	Dog Island	TX			x							x		
MBTP	Matagorda Bay	Tres Palacios Bay	TX	x	x	x	x	x	x	x			x		x
MBCB	Matagorda Bay	Carancahua Bay	TX			x				x	x		x		x
MBLR	Matagorda Bay	Lavaca River	TX	x	x		x	x	x	x			x		x
MBGP	Matagorda Bay	Gallinipper Point	TX	x	x	x	x		x	x	x		x		x
ESBD	Espiritu Santo	Bill Days Reef	TX			x	x	x		x	x		x		x
ESSP	Espiritu Santo	South Pass River	TX	x	x			x	x	x			x		x
SAMP	San Antonio	Mosquito Point	TX	x	x		x		x	x			x		x
SAPP	San Antonio	Panther Point	TX	x	x			x	x	x	x		x		x
MBAR	Mesquite Bay	Ayres Point	TX	x	x	x	x	x	x	x	x		x		x
ABLR	Aransas Bay	Long Reef	TX	x	x	x	x	x	x	x	x		x		x
CBCR	Copano Bay	Copano Reef	TX	x	x	x	x	x	x				x		x
ABHI	Aransas Bay	Harbor Island	TX			x									
CCIC	Corpus Christi	Ingleside Cove	TX	x		x	x	x	x						
CCNB	Corpus Christi	Nueces Bay	TX	x	x	x	x	x		x	x		x		x
CCBH	Corpus Christi	Boat Harbor	TX			x		x					x		x

Table B.2. Mussel Watch Project tissue sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
LMAC	L. Laguna Madre	Arroyo Colorado	TX					x		x		x			x
LMPI	Laguna Madre	Port Isabel	TX			x				x		x	x	x	x
LMSB	L. Laguna Madre	South Bay	TX	x	x	x	x	x	x	x	x	x	x	x	x
IBNJ	Imperial Beach	North Jetty	CA	x	x	x	x	x	x	x			x		x
SDCB	San Diego Bay	Coronado Bridge	CA				x	x	x	x	x	x	x		x
PLLH	Pt. Loma	Lighthouse	CA	x	x	x	x	x	x	x			x		x
SDHI	San Diego Bay	Harbor Island	CA	x	x	x	x	x	x	x			x		x
MBVB	Mission Bay	Ventura Bridge	CA	x	x	x	x	x	x	x			x		x
LJLJ	La Jolla	Point La Jolla	CA	x	x	x	x	x	x	x		x	x		x
OSBJ	Oceanside	Beach Jetty	CA	x	x	x	x	x	x	x			x		x
NBWJ	Newport Beach	West Jetty	CA	x	x	x	x	x	x		x				x
SCBR	Santa Catalina	Bird Rock	CA	x	x	x		x	x	x		x			x
ABWJ	Anaheim Bay	West Jetty	CA	x	x	x	x	x	x	x			x		x
LBBW	Long Beach	Breakwater	CA					x	x	x	x	x			x
SPFP	San Pedro Harbor	Fishing Pier	CA	x	x	x	x	x	x	x		x			x
PVRP	Palos Verdes	Royal Palms	CA	x	x	x	x	x	x	x			x		x
RBMJ	Redondo Beach	Municipal Jetty	CA					x	x	x	x				x
MDSJ	Marina Del Rey	South Jetty	CA	x	x	x	x	x	x	x			x		x
TBSM	Las Tunas Beach	Santa Monica Bay	CA					x	x	x	x				x
PDPD	Pt. Dume	Point Dume	CA	x	x	x	x	x	x	x			x		x
SCFP	Santa Cruz Is.	Fraser Point	CA	x	x	x		x	x	x		x			x
SANM	San Miguel Is.	Tyler Bight	CA			x									
SBSB	Pt. S. Barbara	Point Santa Barbara	CA	x	x	x	x	x	x	x	x				x
PCPC	Pt. Conception	Point Conception	CA	x	x	x	x	x	x	x		x			x
SLSL	San Luis Obispo	Point San Luis	CA	x	x	x	x	x	x	x			x		x
SSSS	San Simeon Point	San Simeon Point	CA	x	x	x	x	x	x	x		x			x
PGLP	Pacific Grove	Lovers Point	CA	x	x	x	x	x	x	x			x		x
MBML	Monterey Bay	Moss Landing	CA					x	x	x	x		x		x
MBES	Monterey Bay	Elkhorn Slough	CA									x	x		x
MBSC	Monterey Bay	Point Santa Cruz	CA	x	x	x	x	x	x	x			x		x
FIEL	Farallon Is.	East Landing	CA			x									
SFDB	San Francisco Bay	Dumbarton Bridge	CA	x	x	x	x	x	x	x			x		x
SFSM	San Francisco Bay	San Mateo Bridge	CA	x	x	x	x	x	x	x		x	x		x
SFEM	San Francisco Bay	Emeryville	CA		x	x	x	x	x	x			x		x
TBSR	Tomales Bay	Spenger's Residence	CA	x	x	x	x	x	x	x		x	x		x
BBBE	Bodega Bay	Bodega Bay Entrance	CA	x	x	x	x	x	x	x			x		x
PALH	Pt. Arena	Lighthouse	CA	x	x	x	x	x	x	x		x	x		x
PDSC	Pt. Delgada	Shelter Cove	CA	x	x	x	x	x	x	x			x		x
HMBJ	Eureka	Humboldt Bay	CA	x	x	x	x	x	x	x			x		x
EUSB	Eureka	Samoa Bridge	CA					x	x	x		x	x		x
KRFR	Klamath River	Flint Rock Harbor	CA				x								
SGSG	Pt. St. George	Point St. George	OR	x	x	x	x	x	x	x			x		x
CBCH	Coos Bay	Coos Head	OR	x	x	x	x	x	x	x		x			x
CBRP	Coos Bay	Russell Point	OR	x	x	x	x	x	x	x			x		x
YBOP	Yaquina Bay	Oneatta Point	OR	x	x	x	x	x	x	x		x	x		x
YHYH	Yaquina Head	Yaquina Head	OR	x	x	x	x	x	x						
YHFC	Yaquina Head	Fogarty Creek	OR								x		x		x
TBHP	Tillamook Bay	Hobsonville	OR	x	x	x	x	x	x	x		x	x		x
CRSJ	Columbia River	South Jetty	OR	x	x	x	x	x	x	x			x		x
CRNJ	Columbia River	North Jetty	WA				x	x							
WBNA	Willapa Bay	Nahcotta	WA					x	x	x	x	x			x
GHWJ	Gray's Harbor	Westport Jetty	WA	x	x	x	x	x	x	x			x		x
JFCF	S. Juan de Fuca	Cape Flattery	WA	x	x	x		x	x	x	x				x
PSPA	Puget Sound	Port Angeles	WA				x	x	x	x	x				x
PSPT	Puget Sound	Port Townsend	WA					x	x	x	x				x
PSHC	Puget Sound	Hood Canal	WA					x	x	x	x			x	x
SSBI	South Puget	Budd Inlet	WA	x	x	x	x	x	x	x			x		x
CBTP	Comm. Bay	Tahlequah Point	WA	x	x	x	x	x	x	x		x			

Table B.2. Mussel Watch Project tissue sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
PSSS	Puget Sound	South Seattle	WA				x	x	x	x	x	x			x
SIWP	Sinclair Inlet	Waterman Point	WA	x	x	x	x	x	x	x	x	x			x
EBDH	Elliott Bay	Duwamish Head	WA					x				x			x
EBFR	Elliott Bay	Four-Mile Rock	WA	x	x	x	x	x	x	x	x	x			x
WIPP	Whidbey Island	Possession Point	WA	x	x	x	x	x	x	x	x		x		x
PSEH	Puget Sound	Everett Harbor	WA				x	x				x			x
BBSM	Bellingham Bay	Squalicum Marina Jetty	WA	x	x	x	x	x	x	x	x		x		x
PRPR	Pt. Roberts	Point Roberts	WA	x	x	x	x	x	x	x	x				
KTMP	Ketchikan	Mountain Point	AK											x	x
NBES	Nahku Bay	East Side	AK											x	x
PWSH	Prince William Snd.	Sheep Bay	AK											x	
PWKH	Prince William Snd.	Knowles Head	AK											x	
PVMC	Port Valdez	Mineral Creek	AK	x	x	x		x	x	x	x		x		x
UISB	Unakwit Inlet	Siwash Bay	AK	x	x	x		x	x	x	x		x		x
PWDI	Prince William Snd.	Disk Island	AK											x	
GASL	Gulf of Alaska	Sleepy Bay	AK											x	
GAWB	Gulf of Alaska	Windy Bay	AK											x	
CIHS	Cook Inlet	Homer Spit	AK											x	x
GASH	Gulf of Alaska	Shuyak Harbor	AK											x	
BPBP	Barber's Pt.	Barber's Pt.	HI	x	x	x		x	x	x		x			
HHKL	Honolulu Harbor	Keehi Lagoon	HI	x	x	x		x	x	x		x			x
HHKB	Hawaii	Kaneohe Bay	HI												x
KAUI	Kauai	Nawiliwili Harbor	HI			x									
GBBS	Green Bay	Bayshore Park	WI								x	x			x
LMMB	Lake Michigan	Milwaukee Bay	WI								x	x			x
LMNC	Lake Michigan	North Chicago NTC	IL								x	x			x
LMCB	Lake Michigan	Calumet Breakwater	IL								x	x			
LMHB	Lake Michigan	Holland Breakwater	MI								x	x			x
LMMU	Lake Michigan	Muskegon Breakwater	MI								x	x			x
TBLL	Traverse Bay	Leelanau State Park	MI												x
LHTB	Thunder Bay	Lake Huron	MI												x
SBSP	Saginaw Bay	Sandy Point	MI							x	x		x		x
SBSR	Saginaw Bay	Saginaw River	MI							x	x		x		x
LHBR	Lake Huron	Black River Canal	MI							x			x		x
LSAB	Lake St. Clair	Anchor Bay	MI							x	x		x		x*
LESP	Lake Erie	Stoney Point	MI							x	x		x		x
LERB	Lake Erie	Reno Beach	OH							x	x		x		x
SBPP	South Bass Island	Peach Orchard Pt.	OH							x	x		x		x
LEOW	Lake Erie	Old Woman Creek	OH										x		x
LELR	Lake Erie	Lorain	OH									x	x		x
LEAB	Lake Erie	Ashtabula	OH									x	x		x
LEDK	Lake Erie	Dunkirk	NY									x	x		x
NRNF	Niagara River	Niagara Falls	NY									x	x		x
LOOC	Lake Ontario	Olcott	NY									x	x		x
LORC	Lake Ontario	Rochester	NY									x	x		x
LOOS	Lake Ontario	Oswego	NY									x	x		x
LOCV	Lake Ontario	Cape Vincent	NY									x	x		x
HRCI	Hudson River	Cruger Island	NY											x	

\* Great Lakes sites are anticipated to be collected in August 1997.

Table B.3. Mussel Watch Project sediment sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
PBPI	Penobscot Bay	Pickering Island	ME		x										x
PBSI	Penobscot Bay	Sears Island	ME	x	x										x
MSSP	Merriconeag Sound	Stover Point	ME			x									x
CAKP	Cape Arundel	Kennebunkport	ME						x						
CAGH	Cape Ann	Gap Head	MA		x										x
SHFP	Salem Harbor	Folger Point	MA			x									x
MBNB	Massachusetts Bay	Nahant Bay	MA					x							
BHDI	Boston Harbor	Deer Island	MA	x	x										x
BHDB	Boston Harbor	Dorchester Bay	MA	x	x										x
BHHB	Boston Harbor	Hingham Bay	MA	x	x										x
MBNR	Massachusetts Bay	North River	MA					x							x
DBCI	Duxbury Bay	Clarks Island	MA				x		x						x
CCNH	Cape Cod	Nauset Harbor	MA				x							x	
BBCC	Buzzards Bay	Cape Cod Canal	MA				x							x	
BBWF	Buzzards Bay	West Falmouth	MA					x							
BBNI	Buzzards Bay	Naushon Island	MA					x							x
BBGN	Buzzards Bay	Goosebury Neck	MA	x	x										x
BBRH	Buzzards Bay	Round Hill	MA	x	x										x
BBAR	Buzzards Bay	Angelica Rock	MA	x	x										x
BBAP	Buzzards Bay	Angelica Point	MA												x
NBMH	Narragansett Bay	Mount Hope Bay	RI	x											x
NBDI	Narragansett Bay	Dyer Island	RI	x	x										x
NBPI	Narragansett Bay	Patience Island	RI				x								
NBDU	Narragansett Bay	Dutch Island	RI	x	x										x
BIBI	Block Island	Block Island	RI		x										
LICR	Long Island Sound	Connecticut River	CT	x	x									x	
LINH	Long Island Sound	New Haven	CT	x				x							
LIHR	Long Island Sound	Housatonic River	CT	x				x							x
LISI	Long Island Sound	Sheffield Island	CT	x	x										x
LIMR	Long Island Sound	Mamaroneck	NY	x	x										x
LITN	Long Island Sound	Throgs Neck	NY	x	x		x								x
LIHH	Long Island Sound	Hempstead Harbor	NY	x	x										x
LIHU	Long Island Sound	Huntington Harbor	NY	x	x										x
LIPJ	Long Island Sound	Port Jefferson	NY	x				x							x
LIGB	Long Island	Gardiners Bay	NY				x								
MBTH	Moriches Bay	Tuthill Point	NY	x	x										x
LIJI	Long Island	Jones Inlet	NY					x							
HRJB	Hudson/Raritan Estuary	Jamaica Bay	NY	x											
HRUB	Hudson/Raritan Estuary	Upper Bay	NY	x	x		x								
HRLB	Hudson Raritan Estuary	Lower Bay	NY	x	x		x								
HRRB	Hudson/Raritan Estuary	Raritan Bay	NY	x											x
NYSH	New York Bight	Sandy Hook	NJ	x	x										
NYSR	New York Bight	Shark River	NJ						x						
BIBL	Barnegat Inlet	Barnegat Light	NJ						x						x
AIAC	Absecon Inlet	Atlantic City	NJ						x						
DBCM	Delaware Bay	Cape May	NJ				x								x
DBFE	Delaware Bay	False Egg Island Point	NJ		x										x
DBBD	Delaware Bay	Ben Davis Point Shoal	NJ		x										x
DBAP	Delaware Bay	Arnolds Point Shoal	NJ	x	x										x
DBHC	Delaware Bay	Hope Creek	NJ				x								
DBKI	Delaware Bay	Kelly Island	DE	x	x										x
DBWB	Delaware Bay	Woodland Beach	DE				x								x
DBCH	Delaware Bay	Cape Henlopen	DE				x								x
CBBO	Chesapeake Bay	Bodkin Point	MD				x								x
CBMP	Chesapeake Bay	Mountain Point Bar	MD	x	x										x
CBHP	Chesapeake Bay	Hackett Point Bar	MD	x	x										x
CBCP	Chesapeake Bay	Choptank River	MD				x								x

Table B.3. Mussel Watch Project sediment sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
CBHG	Chesapeake Bay	Hog Point	MD	x											x
PRSP	Potomac River	Swan Point	MD				x								x
PRMC	Potomac River	Mattox Creek	VA					x							x
PRRP	Potomac River	Ragged Point	VA				x								x
CBIB	Chesapeake Bay	Ingram Bay	VA	x	x										
RRRR	Rappahannock River	Ross Rock	VA				x								x
CBDP	Chesapeake Bay	Dandy Point	VA	x	x										x
CBJR	Chesapeake Bay	James River	VA				x								x
CBCC	Chesapeake Bay	Cape Charles	VA	x	x										
QIUB	Quinby Inlet	Upshur Bay	VA	x	x									x	
CBCI	Chincoteague Bay	Chincoteague Inlet	VA	x											
RSJC	Roanoke Sound	John Creek	VA	x					x						
PSCH	Pamlico Sound	Cape Hatteras	NC					x							
PSWB	Pamlico Sound	Wysocking Bay	NC	x					x						x
PSPR	Pamlico Sound	Pungo River	NC				x								x
PSNR	Pamlico Sound	Neuse River	NC				x								x
BIPI	Beaufort Inlet	Pivers Island	NC					x						x	
CFBI	Cape Fear	Battery Island	NC	x	x										x
WBLB	Winyah Bay	Lower Bay	SC					x	x						x
SRNB	Santee River	North Bay	SC				x	x							x
CHFJ	Charleston Harbor	Fort Johnson	SC		x			x							x
CHSF	Charleston Harbor	Shutes Folly Island	SC	x	x			x							x
SRTI	Savannah R. Estuary	Tybee Island	GA	x	x			x							
SSSI	Sapelo Sound	Sapelo Island	GA	x					x						
ARWI	Altamaha River	Wolfe Island	GA				x	x	x						
SJCB	St. Johns River	Chicopit Bay	FL	x	x										x
MRCB	Matanzas River	Crescent Beach	FL	x					x						
IRSR	Indian River	Sebastian River	FL				x		x						x
NMML	North Miami	Maule Lake	FL				x								x
BBGC	Biscayne Bay	Gould's Canal	FL					x							x
BBPC	Biscayne Bay	Princeton Canal	FL	x	x										
PRBB	Puerto Rico	Bahia de Boqueron	PR							x					x
PRBM	Puerto Rico	Bahia Montalva	PR							x					x
PRBJ	Puerto Rico	Bahia de Jobos	PR							x					x
FBJB	Florida Bay	Joe Bay	FL									x			
FBJB	Florida Bay	Flamingo	FL									x			
EVFU	Everglades	Faka Union Bay	FL	x	x										x
RBHC	Rookery Bay	Henderson Creek	FL	x	x										x
NBNB	Naples Bay	Naples Bay	FL	x	x										x
CBBI	Charlotte Harbor	Bird Island	FL	x	x										x
CBFM	Charlotte Harbor	Fort Meyers	FL				x								
TBCB	Tampa Bay	Cockroach Bay	FL	x	x										
TBHB	Tampa Bay	Hillsborough Bay	FL	x	x										x
TBKA	Tampa Bay	Peter O. Knight Airport	FL					x							x
TBOT	Tampa Bay	Old Tampa Bay	FL				x								x
TBPB	Tampa Bay	Papys Bayou	FL	x	x										x
TBMK	Tampa Bay	Mullet Key Bayou	FL	x	x										x
TBNP	Tampa Bay	Navarez Park	FL					x							x
CKBP	Cedar Key	Black Point	FL	x	x										x
SRWP	Suwannee River	West Pass	FL				x								
AESP	Apalachee Bay	Spring Creek	FL					x							x
APCP	Apalachicola Bay	Cat Point Bar	FL	x	x										x
APDB	Apalachicola Bay	Dry Bar	FL	x	x										x
SAWB	St. Andrew Bay	Watson Bayou	FL	x	x			x							x
PCMP	Panama City	Municipal Pier	FL				x	x							x
PCLO	Panama City	Little Oyster Bar	FL				x	x							x
CBSR	Choctawhatchee Bay	Off Santa Rosa	FL	x	x			x							x
CBJB	Choctawhatchee Bay	Joe's Bayou	FL					x							x
CBBL	Choctawhatchee Bay	Ben's Lake	FL							x					x

Table B.3. Mussel Watch Project sediment sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
CBPP	Choctawhatchee Bay	Postil Point	FL	x	x			x							x
CBBB	Choctawhatchee Bay	Boggy Bayou	FL							x					x
PBSP	Pensacola Bay	Sabine Point	FL					x							x
PBIB	Pensacola Bay	Indian Bayou	FL	x	x										
PBPH	Pensacola Bay	Public Harbor	FL							x					
MBDR	Mobile Bay	Dog River	AL					x							x
MBHI	Mobile Bay	Hollingers Island Chan.	AL				x								x
MBCP	Mobile Bay	Cedar Point Reef	AL	x	x										x
MSPB	Mississippi Sound	Pascagoula Bay	MS	x	x										x
MSBB	Mississippi Sound	Biloxi Bay	MS	x	x										
MSPC	Mississippi Sound	Pass Christian	MS	x	x										x
LBGO	Lake Borgne	Gulf Outlet	LA				x								
LPNO	Lake Pontchartrain	New Orleans	LA												x
LBMP	Lake Borgne	Malheureux Point	LA	x	x										x
BBSG	Breton Sound	Bay Gardene	LA	x	x										x
BSSI	Breton Sound	Sable Island	LA	x	x										x
MRPL	Mississippi River	Pass A Loutre	LA				x								x
MRTP	Mississippi River	Tiger Pass	LA				x								x
BBMB	Barataria Bay	Middle Bank	LA	x	x										x
BBSD	Barataria Bay	Bayou Saint Denis	LA	x	x										x
BBTB	Barataria Bay	Turtle Bay	LA				x								
TBLF	Terrebonne Bay	Lake Felicity	LA	x	x										x
TBLB	Terrebonne Bay	Lake Barre	LA	x	x										x
CLCL	Caillou Lake	Caillou Lake	LA	x	x										x
ABOB	Atchafalaya Bay	Oyster Bayou	LA	x	x										x
ECSP	East Cote Blanche	South Point	LA	x											
VBSP	Vermilion Bay	Southwest Pass	LA	x	x										x
JHJH	Joseph Harbor Bayou	Joseph Harbor Bay	LA	x	x										x
CLLC	Calcasieu Lake	Lake Charles	LA				x								x
CLSJ	Calcasieu Lake	St. Johns Island	LA	x	x										x
SLBB	Sabine Lake	Blue Buck Point	TX	x	x										x
GBHR	Galveston Bay	Hanna Reef	TX	x	x								x		x
GBSC	Galveston Bay	Ship Channel	TX			x		x							
GBYC	Galveston Bay	Yacht Club	TX	x	x			x					x		x
GBTD	Galveston Bay	Todd's Dump	TX	x	x								x		x
GBOB	Galveston Bay	Offatts Bayou	TX				x						x		x
GBCR	Galveston Bay	Confederate Reef	TX	x	x								x		x
BRFS	Brazos River	Freeport Surfside	TX				x						x		x
BRCL	Brazos River	Cedar Lakes	TX					x					x		x
MBEM	Matagorda Bay	East Matagorda	TX	x	x								x		x
MBDI	Matagorda Bay	Dog Island	TX				x						x		
MBTP	Matagorda Bay	Tres Palacios Bay	TX	x	x								x		x
MBCB	Matagorda Bay	Carancahua Bay	TX				x						x		x
MBLR	Matagorda Bay	Lavaca River Mouth	TX	x	x								x		x
MBGP	Matagorda Bay	Gallinipper Point	TX	x	x								x		x
ESBD	Espiritu Santo	Bill Days Reef	TX	x	x	x							x		x
ESSP	Espiritu Santo	South Pass Reef	TX	x	x								x		x
SAMP	San Antonio Bay	Mosquito Point	TX	x	x								x		x
SAPP	San Antonio Bay	Panther Point Reef	TX	x	x								x		x
MBAR	Mesquite Bay	Ayres Reef	TX	x	x								x		x
ABLR	Aransas Bay	Long Reef	TX	x	x								x		x
CBCR	Copano Bay	Copano Reef	TX	x	x								x		x
ABHI	Aransas Bay	Harbor Island	TX				x								
CCIC	Corpus Christi	Ingleside Cove	TX	x	x										x
CCNB	Corpus Christi	Nueces Bay	TX	x	x								x		x
CCBH	Corpus Christi	Boat Harbor	TX				x						x		x
LMPI	Lower Laguna Madre	Port Isabel	TX				x						x		x

Table B.3. Mussel Watch Project sediment sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97
LMSB	Lower Laguna Madre	South Bay	TX	x	x								x	x	
IBNJ	Imperial Beach	North Jetty	CA	x											
SDCB	San Diego Bay	Coronado Bridge	CA				x								
PLLH	Pt. Loma	Lighthouse	CA	x	x										x
SDHI	San Diego Bay	Harbor Island	CA	x	x										x
MBVB	Mission Bay	Ventura Bridge	CA	x											
LJLJ	La Jolla	Point La Jolla	CA		x										x
OSBJ	Oceanside	Municipal Beach Jetty	CA	x	x										x
NBWJ	Newport Beach	West Jetty	CA	x	x									x	
ABWJ	Anaheim Bay	West Jetty	CA	x	x									x	
LBBW	Long Beach	Breakwater	CA					x						x	
SPFP	San Pedro Harbor	Fishing Pier	CA	x	x									x	
PVRP	Palos Verdes	Royal Palms State Park	CA	x	x									x	
RBMJ	Redondo Beach	Municipal Jetty	CA					x							
MDSJ	Marina Del Rey	South Jetty	CA	x	x									x	
TBSM	Las Tunas Beach	Santa Monica Bay	CA					x						x	
PDPD	Point Dume	Point Dume	CA	x	x									x	
SBSB	Point Santa Barbara	Point Santa Barbara	CA	x	x									x	
PCPC	Point Conception	Point Conception	CA	x											
SLSL	San Luis Obispo Bay	Point San Luis	CA	x											
SSSS	San Simeon Point	San Simeon Point	CA	x	x										
PGLP	Pacific Grove	Lovers Point	CA	x											
MBES	Monterey Bay	Elkhorn Slough	CA									x			x
MBSC	Monterey Bay	Point Santa Cruz	CA	x											
SFDB	San Francisco Bay	Dumbarton Bridge	CA	x	x										x
SFSM	San Francisco Bay	San Mateo Bridge	CA	x	x										x
SFEM	San Francisco Bay	Emeryville	CA	x	x										x
SPSM	San Pablo Bay	Semple Point	CA	x	x										
SPSP	San Pablo Bay	Point San Pedro	CA	x	x										
TBSR	Tomales Bay	Spenger's Residence	CA	x	x										x
BBBE	Bodega Bay	Bodega Bay Entrance	CA	x											
HMBJ	Eureka	Humboldt Bay Jetty	CA	x											
EUSB	Eureka	Samoa Bridge	CA					x							x
CBCH	Coos Bay	Coos Head	OR	x	x									x	
CBRP	Coos Bay	Russell Point	OR	x	x									x	
YBOP	Yaquina Bay	Oneatta Point	OR	x	x										x
YHSS	Yaquina Head	Sally's Slough	OR	x	x										x
TBHP	Tillamook Bay	Hobsonville Point	OR	x	x										x
CRYB	Columbia River	Youngs Bay	OR	x	x										x
CRNJ	Columbia River	North Jetty	WA				x								
WBNA	Willapa Bay	Nahcotta	WA					x							x
GHWJ	Gray's Harbor	Westport Jetty	WA	x				x							
JFNB	Strait of Juan de Fuca	Neah Bay	WA	x	x	x									x
PSPA	Puget Sound	Port Angeles	WA				x								x
PSPT	Puget Sound	Port Townsend	WA					x							x
PSHC	Puget Sound	Hood Canal	WA				x								x
SSBI	South Puget Sound	Budd Inlet	WA	x	x										x
CBBP	Commencement Bay	Browns Point	WA	x	x										x
PSSS	Puget Sound	South Seattle	WA					x							x
SIWP	Sinclair Inlet	Waterman Point	WA	x	x										x
EBDH	Elliott Bay	Duwamish Head	WA					x							x
EBFR	Elliott Bay	Four-Mile Rock	WA	x				x							x
WIPP	Whidbey Island	Possession Point	WA	x	x										x
PSEH	Puget Sound	Everett Harbor	WA					x							x
BBSM	Bellingham Bay	Squalicum Marina Jetty	WA	x	x										x

Table B.3. Mussel Watch Project sediment sampling years.

Site	Main Location	Specific Location	State	86	87	88	89	90	91	92	93	94	95	96	97	
PRPR	Point Roberts	Point Roberts	WA	x	x										x	
NBES	Nahku Bay	East Side	AK													x
PWSH	Prince William Sound	Sheep Bay	AK										x			
PWKH	Prince William Sound	Knowles Head	AK										x			
PVMC	Port Valdez	Mineral Creek Flats	AK	x	x											
UISB	Unakwit Inlet	Siwash Bay	AK	x	x											
PWDI	Prince William Sound	Disk Island	AK										x			
GASL	Prince William Sound	Sleepy Bay	AK										x			
GAWB	Gulf of Alaska	Windy Bay	AK										x			
CIHS	Cook Inlet	Homer Spit	AK										x			
GASH	Gulf of Alaska	Shuyak Harbor	AK										x			
BPBP	Barber's Point	Barber's Pt. Boat Basin	HI	x	x											
HHKL	Honolulu Harbor	Keehi Lagoon	HI	x	x										x	
HHKB	Hawaii	Kaneohe Bay	HI												x	
GBBS	Green Bay	Bayshore Park	WI							x						
LMMB	Lake Michigan	Milwaukee Bay	WI							x						
LMHB	Lake Michigan	Holland Breakwater	MI												x	
LMMU	Lake Michigan	Muskegon Breakwater	MI												x	
SBSR	Saginaw Bay	Saginaw River	MI							x						
LSAB	Lake St. Clair	Anchor Bay	MI							x						
LESP	Lake Erie	Stony Point	MI							x						
LERB	Lake Erie	Reno Beach	OH							x						
SBPP	Lake Erie	Peach Orchard Point	OH							x						
LEOW	Lake Erie	Old Woman Creek	OH											x		
LELR	Lake Erie	Lorain	OH									x				
LEAB	Lake Erie	Ashtabula	OH									x				
LEDK	Lake Erie	Dunkirk	NY									x				
NRNF	Niagara River	Niagara Falls	NY									x				
LOOC	Lake Ontario	Olcott	NY									x				
LORC	Lake Ontario	Rochester	NY									x				
LOCV	Lake Ontario	Cape Vincent	NY									x				
HRCI	Hudson River	Cruger Island	NY											x		

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
PBPI	Penobscot Bay	Pickering Island	ME	29-Mar
PBSI	Penobscot Bay	Sears Island	ME	28-Mar
MSSP	Merriconeag Sound	Stover Point	ME	30-Mar
CAKP	Cape Arundel	Kennebunkport	ME	31-Mar
GBDP	Great Bay	Dover Point	NH	26-Mar
CAGH	Cape Ann	Gap Head	MA	18-Mar
SHFP	Salem Harbor	Folger Point	MA	20-Mar
MBNB	Massachusetts Bay	Nahant Bay	MA	9-Mar
BHDI	Boston Harbor	Deer Island	MA	5-Mar
BHDB	Boston Harbor	Dorchester Bay	MA	7-Mar
BHHB	Boston Harbor	Hingham Bay	MA	7-Mar
BHBI	Boston Harbor	Brewster Island	MA	19-Mar
MBNR	Massachusetts Bay	North River	MA	11-Mar
DBCI	Duxbury Bay	Clarks Island	MA	12-Mar
CCNH	Cape Cod	Nauset Harbor	MA	11-Mar
BBCC	Buzzards Bay	Cape Cod Canal	MA	15-Mar
BBWF	Buzzards Bay	West Falmouth	MA	24-Mar
BBNI	Buzzards Bay	Naushon Island	MA	24-Mar
BBGN	Buzzards Bay	Goosebury Neck	MA	18-Mar
BBRH	Buzzards Bay	Round Hill	MA	22-Mar
BBAR	Buzzards Bay	Angelica Rock	MA	21-Mar
BBAP	Buzzards Bay	Angelica Point	MA	11-Mar
NBMH	Narragansett Bay	Mount Hope Bay	RI	21-Mar
NBDI	Narragansett Bay	Dyer Island	RI	27-Mar
NBPI	Narragansett Bay	Patience Island	RI	25-Mar
NBDU	Narragansett Bay	Dutch Island	RI	25-Mar
BIBI	Block Island Sound	Block Island	RI	26-Mar
LICR	Long Island Sound	Connecticut River	CT	27-Nov
LINH	Long Island Sound	New Haven	CT	28-Nov
LIHR	Long Island Sound	Housatonic River	CT	29-Nov
LISI	Long Island Sound	Sheffield Island	CT	30-Nov
LIMR	Long Island Sound	Mamaroneck	NY	28-Nov
LITN	Long Island Sound	Throgs Neck	NY	29-Nov
LIHH	Long Island Sound	Hempstead Harbor	NY	30-Nov
LIHU	Long Island Sound	Huntington Harbor	NY	1-Dec
LIPJ	Long Island Sound	Port Jefferson	NY	1-Dec
LIGB	Long Island	Gardiners Bay	NY	19-Dec
MBTH	Moriches Bay	Tuthill Point	NY	2-Dec
LIFI	Long Island	Fire Island Inlet	NY	2-Dec
LIJI	Long Island	Jones Inlet	NY	2-Dec
HRJB	Hudson/Raritan Estuary	Jamaica Bay	NY	3-Dec
HRUB	Hudson/Raritan Estuary	Upper Bay	NY	6-Dec
HRLB	Hudson/Raritan Estuary	Lower Bay	NY	8-Dec
HRRB	Hudson/Raritan Estuary	Raritan Bay	NJ	9-Dec
NYSH	New York Bight	Sandy Hook	NJ	8-Dec
NYLB	New York Bight	Long Branch	NJ	6-Dec
NYSR	New York Bight	Shark River	NJ	6-Dec
BIBL	Barnegat Inlet	Barnegat Light	NJ	8-Dec
AIAC	Absecon Inlet	Atlantic City	NJ	8-Dec
DBCM	Delaware Bay	Cape May	NJ	9-Dec
DBFE	Delaware Bay	False Egg Island Point	NJ	11-Dec
DBBD	Delaware Bay	Ben Davis Pt. Shoal	NJ	12-Dec
DBAP	Delaware Bay	Arnolds Point Shoal	NJ	14-Dec
DBHC	Delaware Bay	Hope Creek	NJ	14-Dec
DBKI	Delaware Bay	Kelly Island	DE	15-Dec

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
DBWB	Delaware Bay	Woodland Beach	DE	15-Dec
DBCH	Delaware Bay	Cape Henlopen	DE	10-Dec
CBBO	Chesapeake Bay	Bodkin Point	MD	7-Jan
CBMP	Chesapeake Bay	Mountain Point Bar	MD	7-Jan
CBHP	Chesapeake Bay	Hackett Point Bar	MD	9-Jan
CBCP	Chesapeake Bay	Choptank River	MD	5-Jan
CBHG	Chesapeake Bay	Hog Point	MD	11-Jan
PRSP	Potomac River	Swan Point	MD	14-Jan
PRMC	Potomac River	Mattox Creek	VA	14-Jan
PRRP	Potomac River	Ragged Point	VA	16-Jan
CBIB	Chesapeake Bay	Ingram Bay	VA	16-Jan
RRRR	Rappahannock River	Ross Rock	VA	17-Jan
CBDP	Chesapeake Bay	Dandy Point	VA	20-Jan
CBJR	Chesapeake Bay	James River	VA	22-Jan
CBCC	Chesapeake Bay	Cape Charles	VA	17-Dec
QIUB	Quinby Inlet	Upshur Bay	VA	18-Dec
CBCI	Chincoteague Bay	Chincoteague Inlet	VA	17-Dec
RSJC	Roanoke Sound	John Creek	NC	26-Jan
PSCH	Pamlico Sound	Cape Hatteras	NC	28-Jan
PSWB	Pamlico Sound	Wysocking Bay	NC	30-Jan
PSPR	Pamlico Sound	Pungo River	NC	31-Jan
PSNR	Pamlico Sound	Neuse River	NC	1-Feb
BIPI	Beaufort Inlet	Pivers Island	NC	2-Feb
CFBI	Cape Fear	Battery Island	NC	3-Feb
WBLB	Winyah Bay	Lower Bay	SC	6-Feb
SRNB	Santee River	North Bay	SC	5-Feb
CHFJ	Charleston Harbor	Fort Johnson	SC	8-Feb
CHSF	Charleston Harbor	Shutes Folly Island	SC	7-Feb
SRTI	Savannah River Estuary	Tybee Island	GA	9-Feb
SSSI	Sapelo Sound	Sapelo Island	GA	11-Feb
ARWI	Altamaha River	Wolfe Island	GA	12-Feb
SJCB	St. Johns River	Chicopit Bay	FL	17-Feb
MRCB	Matanzas River	Crescent Beach	FL	18-Feb
IRSR	Indian River	Sebastian River	FL	18-Feb
NMML	North Miami	Maule Lake	FL	21-Feb
BBGC	Biscayne Bay	Gould's Canal	FL	24-Feb
BBPC	Biscayne Bay	Princeton Canal	FL	20-Feb
PRBB	Puerto Rico	Bahia de Boqueron	PR	11-Feb
PRBM	Puerto Rico	Bahia Montalva	PR	13-Feb
PRBJ	Puerto Rico	Bahia de Jobos	PR	14-Feb
BHKF	Florida Keys	Bahia Honda	FL	22-Jan
FBJB	Florida Bay	Joe Bay	FL	25-Jan
FBFO	Florida Bay	Flamingo	FL	25-Jan
EVFU	Everglades	Faka Union Bay	FL	30-Jan
RBHC	Rookery Bay	Henderson Creek	FL	30-Jan
NBNB	Naples Bay	Naples Bay	FL	29-Jan
CBBI	Charlotte Harbor	Bird Island	FL	31-Jan
CBFM	Charlotte Harbor	Fort Meyers	FL	31-Jan
TBCB	Tampa Bay	Cockroach Bay	FL	1-Feb
TBHB	Tampa Bay	Hillsborough Bay	FL	31-Jan
TBKA	Tampa Bay	Peter O. Knight Airport	FL	31-Jan
TBOT	Tampa Bay	Old Tampa Bay	FL	30-Jan
TBPB	Tampa Bay	Papys Bayou	FL	31-Jan
TBMK	Tampa Bay	Mullet Key Bayou	FL	31-Jan
TBNP	Tampa Bay	Navarez Park	FL	1-Feb
CKBP	Cedar Key	Black Point	FL	29-Jan
SRWP	Suwannee River	West Pass	FL	29-Jan

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
AESP	Apalachee Bay	Spring Creek	FL	29-Jan
APCP	Apalachicola Bay	Cat Point Bar	FL	28-Jan
APDB	Apalachicola Bay	Dry Bar	FL	27-Jan
SAWB	St. Andrew Bay	Watson Bayou	FL	28-Jan
PCMP	Panama City	Municipal Pier	FL	27-Jan
PALO	Panama City	Little Oyster Bar	FL	28-Jan
CBSR	Choctawhatchee Bay	Off Santa Rosa	FL	27-Jan
CBJB	Choctawhatchee Bay	Joe's Bayou	FL	27-Jan
CBBL	Choctawhatchee Bay	Ben's Lake	FL	23-Jan
CBPP	Choctawhatchee Bay	Postil Point	FL	23-Jan
CBBB	Choctawhatchee Bay	Boggy Bayou	FL	23-Jan
PBSP	Pensacola Bay	Sabine Point	FL	26-Jan
PBIB	Pensacola Bay	Indian Bayou	FL	26-Jan
PBPH	Pensacola Bay	Public Harbor	FL	26-Jan
MBDR	Mobile Bay	Dog River	AL	10-Jan
MBHI	Mobile Bay	Hollingers Is. Chan.	AL	10-Jan
MBCP	Mobile Bay	Cedar Point Reef	AL	9-Jan
MSPB	Mississippi Sound	Pascagoula Bay	MS	12-Jan
MSBB	Mississippi Sound	Biloxi Bay	MS	11-Jan
MSPC	Mississippi Sound	Pass Christian	MS	10-Jan
LPNO*	Lake Pontchartrain	New Orleans	LA	25-Jan
LBGO**	Lake Borgne	Gulf Outlet	LA	9-Jan
LBMP	Lake Borgne	Malheureux Point	LA	8-Jan
BSEB	Breton Sound	Bay Gardene	LA	8-Jan
BSSI	Breton Sound	Sable Island	LA	9-Jan
MRPL	Mississippi River	Pass A Loutre	LA	9-Jan
M RTP	Mississippi River	Tiger Pass	LA	8-Jan
BBMB	Barataria Bay	Middle Bank	LA	7-Jan
BBSD	Barataria Bay	Bayou Saint Denis	LA	6-Jan
BBTB	Barataria Bay	Turtle Bay	LA	6-Jan
TBLF	Terrebonne Bay	Lake Felicity	LA	7-Jan
TBLB	Terrebonne Bay	Lake Barre	LA	6-Jan
CLCL	Caillou Lake	Caillou Lake	LA	7-Jan
ABOB	Atchafalaya Bay	Oyster Bayou	LA	7-Jan
ECSP	East Cote Blanche	South Point	LA	8-Jan
VBSP	Vermilion Bay	Southwest Pass	LA	8-Jan
JHJH	Joseph Harbor Bayou	Joseph Harbor Bayou	LA	6-Jan
CLLC	Calcasieu Lake	Lake Charles	LA	7-Dec
CLSJ	Calcasieu Lake	St. Johns Island	LA	7-Dec
SLBB	Sabine Lake	Blue Buck Point	LA	6-Dec
GBHR	Galveston Bay	Hanna Reef	TX	6-Dec
GBSC	Galveston Bay	Ship Channel	TX	5-Dec
GBYC	Galveston Bay	Yacht Club	TX	5-Dec
GBTD	Galveston Bay	Todd's Dump	TX	6-Dec
GBOB	Galveston Bay	Offatts Bayou	TX	5-Dec
GBCR	Galveston Bay	Confederate Reef	TX	5-Dec
BRFS	Brazos River	Freeport Surfside	TX	4-Dec
BRCL	Brazos River	Cedar Lakes	TX	4-Dec
MBEM	Matagorda Bay	East Matagorda	TX	14-Dec
MBDI	Matagorda Bay	Dog Island	TX	14-Dec
MBTP	Matagorda Bay	Tres Palacios Bay	TX	14-Dec
MBCB	Matagorda Bay	Carancahua Bay	TX	16-Dec
MBLR	Matagorda Bay	Lavaca River Mouth	TX	15-Dec
MBGP	Matagorda Bay	Gallinipper Point	TX	15-Dec
ESBD	Espiritu Santo	Bill Days Reef	TX	15-Dec
ESSP	Espiritu Santo	South Pass Reef	TX	15-Dec
SAMP	San Antonio Bay	Mosquito Point	TX	15-Dec

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
SAPP	San Antonio Bay	Panther Point Reef	TX	15-Dec
MBAR	Mesquite Bay	Ayres Reef	TX	15-Dec
ABLR	Aransas Bay	Long Reef	TX	15-Dec
CBCR	Copano Bay	Copano Reef	TX	13-Dec
ABHI	Aransas Bay	Harbor Island	TX	13-Dec
CCIC	Corpus Christi	Ingleside Cove	TX	14-Dec
CCNB	Corpus Christi	Nueces Bay	TX	14-Dec
CCBH	Corpus Christi	Boat Harbor	TX	16-Dec
LMAC	Lower Laguna Madre	Arroyo Colorado	TX	14-Dec
LMPI	Lower Laguna Madre	Port Isabel	TX	13-Dec
LMSB	Lower Laguna Madre	South Bay	TX	13-Dec
IBNJ	Imperial Beach	North Jetty	CA	10-Dec
SDCB	San Diego Bay	Coronado Bridge	CA	12-Dec
PLLH	Point Loma	Lighthouse	CA	26-Jan
SDHI	San Diego Bay	Harbor Island	CA	9-Dec
MBVB	Mission Bay	Ventura Bridge	CA	11-Dec
LJLJ	La Jolla	Point La Jolla	CA	28-Jan
OSBJ	Oceanside	Municipal Beach Jetty	CA	27-Jan
NBWJ	Newport Beach	West Jetty	CA	25-Jan
SCBR	South Catalina Island	Bird Rock	CA	9-Mar
ABWJ	Anaheim Bay	West Jetty	CA	8-Dec
LBBW	Long Beach	Breakwater	CA	7-Mar
SPFP	San Pedro Harbor	Fishing Pier	CA	13-Dec
PVRP	Palos Verdes	Royal Palms State Park	CA	3-Dec
RBMJ	Redondo Beach	Municipal Jetty	CA	6-Mar
MDSJ	Marina Del Rey	South Jetty	CA	2-Dec
TBSM	Las Tunas Beach	Santa Monica Bay	CA	5-Mar
PDPD	Point Dume	Point Dume	CA	1-Dec
SCFP	Santa Cruz Island	Fraser Point	CA	22-Feb
SANM	San Miguel Island	Tyler Bight	CA	14-Mar
SBSB	Point Santa Barbara	Point Santa Barbara	CA	29-Nov
PCPC	Point Conception	Point Conception	CA	23-Feb
SLSL	San Luis Obispo Bay	Point San Luis	CA	30-Nov
SSSS	San Simeon Point	San Simeon Point	CA	25-Feb
PGLP	Pacific Grove	Lovers Point	CA	25-Feb
MBML	Monterey Bay	Moss Landing	CA	10-Feb
MBES	Monterey Bay	Elkhorn Slough	CA	10-Feb
MBSC	Monterey Bay	Point Santa Cruz	CA	26-Feb
FIEL	Farallon Islands	East Landing	CA	15-Jan
SFDB	San Francisco Bay	Dumbarton Bridge	CA	4-Feb
SFSM	San Francisco Bay	San Mateo Bridge	CA	5-Feb
SFEM	San Francisco Bay	Emeryville	CA	8-Feb
SPSM	San Pablo Bay	Semple Point	CA	10-Apr
SPSP	San Pablo Bay	Point San Pedro	CA	10-Apr
TBSR	Tomaes Bay	Spenger's Residence	CA	9-Feb
BBBE	Bodega Bay	Bodega Bay Entrance	CA	8-Jan
PALH	Point Arena	Lighthouse	CA	9-Jan
PDSC	Point Delgada	Shelter Cove	CA	10-Jan
HMBJ	Eureka	Humboldt Bay Jetty	CA	11-Jan
EUSB	Eureka	Samoa Bridge	CA	15-Jan
KRFR	Klamath River	Flint Rock Head	CA	8-Jan
SGSG	Crescent	Point St. George	CA	13-Jan
CBCH	Coos Bay	Coos Head	OR	12-Dec
CBRP	Coos Bay	Russell Point	OR	12-Dec
YBOP	Yaquina Bay	Oneatta Point	OR	12-Dec
YHYH	Yaquina Bay	Yaquina Head	OR	12-Dec
YHSS	Yaquina Bay	Sally's Slough	OR	12-Dec

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
YHFC	Yaquina Bay	Fogarty Creek	OR	13-Dec
TBHP	Tillamook Bay	Hobsonville Point	OR	11-Dec
CRSJ	Columbia River	South Jetty	OR	15-Feb
CRYB	Columbia River	Youngs Bay	OR	15-Feb
CRNJ	Columbia River	North Jetty	WA	5-Feb
WBNA	Willapa Bay	Nahcotta	WA	6-Feb
GHWJ	Gray's Harbor	Westport Jetty	WA	21-Feb
JFCF	Strait of Juan de Fuca	Cape Flattery	WA	3-Mar
JFNB	Strait of Juan de Fuca	Neah Bay	WA	3-Mar
PSPA	Puget Sound	Port Angeles	WA	8-Jan
PSPT	Puget Sound	Port Townsend	WA	8-Jan
PSHC	Puget Sound	Hood Canal	WA	8-Jan
SSBI	South Puget Sound	Budd Inlet	WA	5-Jan
CBTP	Commencement Bay	Tahlequah Point	WA	11-Dec
CBBP	Commencement Bay	Browns Point	WA	11-Dec
PSSS	Puget Sound	South Seattle	WA	11-Dec
SIWP	Sinclair Inlet	Waterman Point	WA	11-Dec
EBDH	Elliott Bay	Duwamish Head	WA	9-Jan
EBFR	Elliott Bay	Four-Mile Rock	WA	11-Dec
WIPP	Whidbey Island	Possession Point	WA	11-Dec
PSEH	Puget Sound	Everett Harbor	WA	9-Jan
BBSM	Bellingham Bay	Squalicum Marina Jet.	WA	9-Jan
PRPR	Point Roberts	Point Roberts	WA	10-Jan
KTMP	Ketchikan	Mountain Point	AK	16-Apr
NBES	Nahku Bay	East Side	AK	7-May
PWSH	Prince William Sound	Sheep Bay	AK	30-Mar
PWKH	Prince William Sound	Knowles Head	AK	29-Mar
PVMC	Port Valdez	Mineral Creek Flats	AK	27-Mar
UIB	Unakwit Inlet	Siwash Bay	AK	26-Mar
PWDI	Prince William Sound	Disk Island	AK	28-Mar
GASL	Prince William Sound	Sleepy Bay	AK	28-Mar
GAWB	Gulf of Alaska	Windy Bay	AK	20-Mar
CIHS	Cook Inlet	Homer Spit	AK	13-Mar
GASH	Gulf of Alaska	Shuyak Harbor	AK	19-Mar
BPBP	Barber's Point	Barber's Pt. Harbor	HI	26-Mar
HHKL	Honolulu Hrb.	Keeki Lagoon	HI	27-Mar
HHKB	Hawaii	Kaneohe Bay	HI	6-Apr
KAUI	Kauai	Nawiliwili Harbor	HI	25-Mar
GBBS	Green Bay	Bayshore Park	WI	22-Aug
LMMB	Lake Michigan	Milwaukee Bay	WI	23-Aug
LMNC	Lake Michigan	North Chicago	IL	24-Aug
LMCB	Lake Michigan	Calumet Breakwater	IN	25-Aug
LMHB	Lake Michigan	Holland Breakwater	MI	26-Aug
LMMU	Lake Michigan	Muskegon	MI	27-Aug
TBLL	Traverse Bay	Leelanau State Park	MI	26-Aug
LHTB	Lake Huron	Thunder Bay	MI	25-Aug
SBSF	Saginaw Bay	Sandpoint	MI	18-Aug
SBSR	Saginaw Bay	Saginaw River	MI	19-Aug
LHBR	Lake Huron	Black River Canal	MI	20-Aug
LSAB	Lake St. Clair	Anchor Bay	MI	20-Aug
LESP	Lake Erie	Stony Point	MI	22-Aug
LERB	Lake Erie	Reno Beach	OH	22-Aug
SBPP	Lake Erie	Peach Orchard Pt.	OH	22-Aug
LEOW	Lake Erie	Old Woman Creek	OH	18-Aug
LELR	Lake Erie	Lorain	OH	19-Aug
LEAB	Lake Erie	Ashtabula	OH	20-Aug
LEDK	Lake Erie	Dunkirk	NY	26-Aug

Table B.4. Mussel Watch Project target collection dates.

Site code	Specific location	General location	State	Target collection date
NRNF	Niagara River	Niagara Falls	NY	22-Aug
LOOC	Lake Ontario	Olcott	NY	23-Aug
LORC	Lake Ontario	Rochester	NY	24-Aug
LOOS	Lake Ontario	Oswego	NY	24-Aug
LOCV	Lake Ontario	Cape Vincent	NY	25-Aug
HRCI	Hudson River	Cruger Island	NY	26-Aug

## Appendix C

### Index by site and location

Absecon Inlet 83  
Altamaha River 120  
Anaheim Bay 224  
Anchor Bay 312  
Angelica Point 56  
Angelica Rock 55  
Apalachee Bay 147  
Apalachicola Bay 148, 149  
Aransas Bay 206, 208  
Arnolds Pt. Shoal 87  
Arroyo Colorado 212  
Ashtabula 318  
Atchafalaya Bay 180  
Atlantic City 83  
Ayres Reef 205  
Bahia de Boqueron 127  
Bahia de Jobos 129  
Bahia Honda Key 130  
Bahia Montalva 128  
Barataria Bay 174, 175, 176  
Barber's Point 297  
Barber's Point Harbor 297  
Barnegat Inlet 82  
Barnegat Light 82  
Battery Island 113  
Bay Gardene 170  
Bayou Saint Denis 175  
Bayshore Park 301  
Beaufort Inlet 112  
Bellingham Bay 283  
Ben Davis Pt. Shoal 86  
Ben's Lake 155  
Bill Days Reef 201  
Biloxi Bay 165  
Bird Island 136  
Bird Rock 223  
Biscayne Bay 125, 126  
Black Point 145  
Black River Canal 311  
Block Island 61  
Block Island Sound 61  
Blue Buck Point 186  
Boat Harbor 211  
Bodega Bay 249  
Bodega Bay Entrance 249  
Bodkin Point 92  
Boggy Bayou 157  
Boston Harbor 43, 44, 45, 46  
Brazos River 193, 194  
Breakwater 225  
Breton Sound 170, 171  
Brewster Island 46  
Browns Point 276  
Budd Inlet 274  
Buzzards Bay 50, 51, 52, 53, 54, 55, 56  
Caillou Lake 179  
Calcasieu Lake 184, 185  
Calumet Breakwater 304  
Cape Ann 40  
Cape Arundel 38  
Cape Charles 104  
Cape Cod 49  
Cape Cod Canal 50  
Cape Fear 113  
Cape Flattery 269  
Cape Hatteras 108  
Cape Henlopen 91  
Cape May 84  
Cape Vincent 324  
Carancahua Bay 198  
Cat Point Bar 148  
Cedar Key 145  
Cedar Lakes 194  
Cedar Point Reef 163  
Charleston Harbor 116, 117  
Charlotte Harbor 136, 137  
Chesapeake Bay 92, 93, 94, 95, 96, 100, 102, 103, 104  
Chicopit Bay 121  
Chincoteague Bay 106  
Chincoteague Inlet 106  
Choctawhatchee Bay 153, 154, 155, 156, 157  
Choptank River 95  
Clarks Island 48  
Cockroach Bay 138  
Columbia River 264, 265, 266  
Commencement Bay 275, 276  
Confederate Reef 192  
Connecticut River 62  
Cook Inlet 295  
Coos Bay 257, 258  
Coos Head 257  
Copano Bay 207  
Copano Reef 207  
Coronado Bridge 216  
Corpus Christi 209, 210, 211  
Crescent Beach 122

Crescent City 256  
 Cruger Island 325  
 Dandy Point 102  
 Deer Island 43  
 Delaware Bay 84, 85, 86, 87, 88, 89, 90,  
     91  
 Disk Island 292  
 Dog Island 196  
 Dog River 161  
 Dorchester Bay 44  
 Dover Pt. 39  
 Dry Bar 149  
 Dumbarton Bridge 243  
 Dunkirk 319  
 Dutch Island 60  
 Duwamish Head 279  
 Duxbury Bay 48  
 Dyer Island 58  
 East Cote Blanche 181  
 East Landing 242  
 East Matagorda 195  
 East Side 286  
 Elkhorn Slough 240  
 Elliott Bay 279, 280  
 Emeryville 245  
 Espiritu Santo 201, 202  
 Eureka 253, 254  
 Everett Harbor 282  
 Everglades 133  
 Faka Union Bay 133  
 False Egg Island Pt. 85  
 Farallon Islands 242  
 Fire Island Inlet 73  
 Fishing Pier 226  
 Flamingo 132  
 Flint Rock Head 255  
 Florida Bay 131, 132  
 Florida Keys 130  
 Fogarty Creek 262  
 Folger Point 41  
 Fort Johnson 116  
 Fort Meyers 137  
 Four-Mile Rock 280  
 Fraser Point 232  
 Freeport Surfside 193  
 Gallinipper Point 200  
 Galveston Bay 187, 188, 189, 190, 191,  
     192  
 Gap Head 40  
 Gardiners Bay 71  
 Goosebury Neck 53  
 Gould's Canal 125  
 Grand Island 320  
 Gray's Harbor 268  
 Great Bay 39  
 Green Bay 301  
 Gulf of Alaska 294, 296  
 Gulf Outlet 168  
 Hackett Point Bar 94  
 Hanna Reef 187  
 Harbor Island 208, 218  
 Hawaii 299  
 Hempstead Harbor 68  
 Henderson Creek 134  
 Hillsborough Bay 139  
 Hingham Bay 45  
 Hobsonville Point 263  
 Hog Point 96  
 Holland Breakwater 305  
 Hollingers Isl. Channel 162  
 Homer Spit 295  
 Honolulu Harbor 298  
 Hood Canal 273  
 Hope Creek 88  
 Housatonic River 64  
 Hud.-Rar. Estuary 75, 76, 77, 78  
 Hudson River 325  
 Humboldt Bay Jetty 253  
 Huntington Harbor 69  
 Imperial Beach 215  
 Indian Bayou 159  
 Indian River 123  
 Ingleside Cove 209  
 Ingram Bay 100  
 Jamaica Bay 75  
 James River 103  
 Joe Bay 131  
 Joe's Bayou 154  
 John Creek 107  
 Jones Inlet 74  
 Joseph Harbor Bayou 183  
 Kaneohe Bay 299  
 Kauai 300  
 Keehi Lagoon 298  
 Kelly Island 89  
 Kennebunkport 38  
 Ketchikan 285  
 Klamath River 255  
 Knowles Head 289  
 La Jolla 220  
 Lake Barre 178  
 Lake Borgne 168, 169  
 Lake Charles 184  
 Lake Erie 313, 314, 316, 317, 318, 319  
 Lake Felicity 177  
 Lake Huron 308, 311  
 Lake Michigan 302, 303, 304, 305, 306  
 Lake Ontario 321, 322, 323, 324

Lake Pontchartrain 167  
 Lake St. Clair 312  
 Las Tunas Beach 230  
 Lavaca River Mouth 199  
 Leelanau State Park 307  
 Lighthouse 217  
 Little Oyster Bar Point 152  
 Long Beach 225  
 Long Branch 80  
 Long Island 71, 73, 74  
 Long Island Sound 62, 63, 64, 65, 66, 67,  
 68, 69, 70  
 Long Reef 206  
 Lorain 317  
 Lovers Point 238  
 Lower Bay 114  
 Lower Bay, Swin.Is. 77  
 Lower Laguna Madre 212, 213, 214  
 Malheureux Point 169  
 Mamaroneck River 66  
 Marina Del Rey 229  
 Massachusetts Bay 42, 47  
 Matagorda Bay 195, 196, 197, 198, 199,  
 200  
 Matanzas River 122  
 Mattox Creek 98  
 Maule Lake 124  
 Merriconeag Sound 37  
 Mesquite Bay 205  
 Middle Bank 174  
 Milwaukee Bay 302  
 Mineral Flats 290  
 Mission Bay 219  
 Mississippi River 172, 173  
 Mississippi Sound 164, 165, 166  
 Mobile Bay 161, 162, 163  
 Monterey Bay 239, 240, 241  
 Moriches Bay 72  
 Mosquito Point 203  
 Moss Landing Beach 239  
 Mount Hope Bay 57  
 Mountain Point 285  
 Mountain Point Bar 93  
 Mullet Key Bayou 143  
 Municipal Beach Jetty 221  
 Municipal Jetty 228  
 Municipal Pier 151  
 Muskegon Breakwater 306  
 Nahant Bay 42  
 Nahcotta 267  
 Nahku Bay 286  
 Naples Bay 135  
 Narragansett Bay 57, 58, 59, 60  
 Nauset Harbor 49  
 Naushon Island 52  
 Navarez Park 144  
 Nawiliwili Harbor 300  
 Neah Bay 270  
 Neuse River 111  
 New Haven 63  
 New Orleans 167  
 New York. Bight 79, 80, 81  
 Newport Beach 222  
 Niagara River 320  
 North Bay 115  
 North Chicago 303  
 North Jetty 215, 266  
 North Miami 124  
 North River 47  
 Nueces Bay 210  
 Oceanside 221  
 Off Santa Rosa 153  
 Offatts Bayou 191  
 Olcott 321  
 Old Tampa Bay 141  
 Old Woman Creek 316  
 Oneatta Point 259  
 Oswego 323  
 Oyster Bayou 180  
 Pacific Grove 238  
 Palos Verdes 227  
 Pamlico Sound 108, 109, 110, 111  
 Panama City 151, 152  
 Panther Point Reef 204  
 Papys Bayou 142  
 Pascagoula Bay 164  
 Pass A Loutre 172  
 Pass Christian 166  
 Patience Island 59  
 Peach Orchard Point 315  
 Penobscot Bay 35, 36  
 Pensacola Bay 158, 159, 160  
 Peter O. Knight Airport 140  
 Pickering Island 35  
 Pivers Island 112  
 Point Arena 250  
 Point Arena Lighthouse 250  
 Point Conception 235  
 Point Delgada 252  
 Point Dume 231  
 Point La Jolla 220  
 Point Loma 217  
 Point Roberts 284  
 Point San Luis 236  
 Point Santa Cruz 241  
 Point St. George 256  
 Port Angeles 271  
 Port Isabel 213

Port Jefferson 70  
 Port Townsend 272  
 Port Valdez 290  
 Possession Point 281  
 Postil Point 156  
 Potomac River 97, 98, 99  
 Prince William Sound 288, 289, 292, 293  
 Princeton Canal 126  
 Pt. San Pedro 247  
 Pt. Santa Barbara 234  
 Public Harbor 160  
 Puerto Rico 127, 128, 129  
 Puget Sound 271, 272, 273, 277, 282  
 Pungo River 110  
 Quinby Inlet 105  
 Ragged Point 99  
 Rappahannock 101  
 Raritan Bay 78  
 Redondo Beach 228  
 Reno Beach 314  
 Roanoke Sound 107  
 Rochester 322  
 Rookery Bay 134  
 Ross Rock 101  
 Round Hill 54  
 Royal Palms State Park 227  
 Russell Point 258  
 Sabine Lake 186  
 Sabine Point 158  
 Sable Island 171  
 Saginaw Bay 309, 310  
 Saginaw River 310  
 Salem Harbor 41  
 Sally's Slough 261  
 Samoa Bridge 254  
 San Antonio Bay 203, 204  
 San Diego Bay 216, 218  
 San Francisco Bay 243, 244, 245  
 San Luis Obispo 236  
 San Mateo Bridge 244  
 San Miguel Island 233  
 San Pablo Bay 246, 247  
 San Pedro Harbor 226  
 San Simeon 237  
 San Simeon Point 237  
 Sand Point 309  
 Sandy Hook 79  
 Santa Barbara 234  
 Santa Catalina Island 223  
 Santa Cruz Island 232  
 Santa Monica Bay 230  
 Santee River 115  
 Sapelo Island 119  
 Sapelo Sound 119  
 Savannah River 118  
 Sears Island 36  
 Sebastian River 123  
 Semple Point 246  
 Shark River 81  
 Sheep Bay 288  
 Sheffield Island 65  
 Shelter Cove 252  
 Ship Channel 188  
 Shutes Folly Island 117  
 Shuyak Harbor 296  
 Sinclair Inlet 278  
 Siwash Bay 291  
 Sleepy Bay 293  
 South Bass 315  
 South Bay 214  
 South Jetty 229, 264  
 South Pass Reef 202  
 South Point 181  
 South Puget Sound 274  
 South Seattle 277  
 Southwest Pass 182  
 Spenger's Residence 248  
 Spring Creek 147  
 Squalicum Marina Jetty 283  
 St. Andrew Bay 150  
 St. Johns Island 185  
 St. Johns River 121  
 Stony Point 313  
 Stover Point 37  
 Strait of Juan de Fuca 269, 270  
 Suwannee River 146  
 Swan Point 97  
 Tahlequah Point 275  
 Tampa Bay 138, 139, 140, 141, 142, 143, 144  
 Terrebonne Bay 177, 178  
 Throgs Neck 67  
 Thunder Bay 308  
 Tiger Pass 173  
 Tillamook Bay 263  
 Todd's Dump 190  
 Tomales Bay 248  
 Traverse bay 307  
 Tres Palacios Bay 197  
 Turtle Bay 176  
 Tuthill Point 72  
 Tybee Island 118  
 Tyler Bight 233  
 Unakwik Inlet 291  
 Upper Bay 76  
 Upshur Bay 105  
 Ventura Bridge 219  
 Vermilion Bay 182

Waterman Point 278  
 Watson Bayou 150  
 West Falmouth 51  
 West Jetty 222, 224  
 West Pass 146  
 Westport Jetty 268  
 Whidbey Island 281  
 Willapa Bay 267  
 Windy Bay 294

Winyah Bay 114  
 Wolfe Island 120  
 Woodland Beach 90  
 Wysocking Bay 109  
 Yacht Club 189  
 Yaquina Bay 259, 260, 261, 262  
 Yaquina Head 260  
 Youngs Bay 265

Index by site code

ABHI 208	CBBP 276	EBDH 279	LEDK 319
ABLR 206	CBCC 104	EBFR 280	LELR 317
ABOB 180	CBCH 257	ECSP 181	LEOW 316
ABWJ 224	CBCI 106	ESBD 201	LERB 314
AESP 147	CBCP 95	ESSP 202	LESP 313
AIAC 83	CBCR 207	EUSB 254	LHBR 311
APCP 148	CBDP 102	EVFU 133	LHTB 308
APDB 149	CBFM 137	FBFO 132	LICR 62
ARWI 120	CBHG 96	FBJB 131	LIFI 73
BBAP 56	CBHP 94	FIEL 242	LIGB 71
BBAR 55	CBIB 100	GASH 296	LIHH 68
BBBE 249	CBJB 154	GASL 293	LIHR 64
BBCC 50	CBJR 103	GAWB 294	LIHU 69
BBGC 125	CBMP 93	GBBS 301	LIJI 74
BBGN 53	CBPP 156	GBCR 192	LIMR 66
BBMB 174	CBRP 258	GBDP 39	LINH 63
BBNI 52	CBSR 153	GBHR 187	LIPJ 70
BBPC 126	CBTP 275	GBOB 191	LISI 65
BBRH 54	CCBH 211	GBSC 188	LITN 67
BBSD 175	CCIC 209	GBTD 190	LJLJ 220
BBSM 283	CCNB 210	GBYC 189	LMAC 212
BBTB 176	CCNH 49	GHWJ 268	LMCB 304
BBWF 51	CFBI 113	HHKB 299	LMHB 305
BHBI 46	CHFJ 116	HHKL 298	LMMB 302
BHDB 44	CHSF 117	HMBJ 253	LMMU 306
BHDI 43	CIHS 295	HRCI 325	LMNC 303
BHHB 45	CKBP 145	HRJB 75	LMPI 213
BHKF 130	CLCL 179	HRLB 77	LMSB 214
BIBI 61	CLLC 184	HRRB 78	LOCV 324
BIBL 82	CLSJ 185	HRUB 76	LOOC 321
BIPI 112	CRNJ 266	IBNJ 215	LOOS 323
BPBP 297	CRSJ 264	IRSR 123	LORC 322
BRCL 194	CRYB 265	JFCF 269	LPNO 167
BRFS 193	DBAP 87	JFNB 270	LSAB 312
BSBG 170	DBBD 86	JHJH 183	MBAR 205
BSSI 171	DBCH 91	KAUI 300	MBCB 198
CAGH 40	DBCI 48	KRFR 255	MBCP 163
CAKP 38	DBCM 84	KTMP 285	MBDI 196
CBBB 157	DBFE 85	LBBW 225	MBDR 161
CBBI 136	DBHC 88	LBGO 168	MBEM 195
CBBL 155	DBKI 89	LBMP 169	MBES 240
CBBO 92	DBWB 90	LEAB 318	MBGP 200

MBHI 162	PSPA 271	TBOT 141
MBLR 199	PSPR 110	TBPB 142
MBML 239	PSPT 272	TBSM 230
MBNB 42	PSSS 277	TBSR 248
MBNR 47	PSWB 109	UISB 291
MBSC 241	PVMC 290	VBSP 182
MBTH 72	PVRP 227	WBLB 114
MBTP 197	PWDI 292	WBNA 267
MBVB 219	PWKH 289	WIPP 281
MDSJ 229	PWSH 288	YBOP 259
MRCB 122	QIUB 105	YHFC 262
MRPL 172	RBHC 134	YHSS 261
M RTP 173	RBMJ 228	YHYH 260
MSBB 165	RRRR 101	
MSPB 164	RSJC 107	
MSPC 166	SAMP 203	
MSSP 37	SANM 233	
NBDI 58	SAPP 204	
NBDU 60	SAWB 150	
NBES 286	SBPP 315	
NBMH 57	SBSB 234	
NBNB 135	SBSP 309	
NBPI 59	SBSR 310	
NBWJ 222	SCBR 223	
NMML 124	SCFP 232	
NRNF 320	SDCB 216	
NYLB 80	SDHI 218	
NYSH 79	SFDB 243	
NYSR 81	SFEM 245	
OSBJ 221	SFSM 244	
PALH 250	SGSG 256	
PBIB 159	SHFP 41	
PBPH 160	SIWP 278	
PBPI 35	SJCB 121	
PBSI 36	SLBB 186	
PBSP 158	SLSL 236	
PCLO 152	SPFP 226	
PCMP 151	SPSM 246	
PCPC 235	SPSP 247	
PDPD 231	SRNB 115	
PDSC 252	SRTI 118	
PGLP 238	SRWP 146	
PLLH 217	SSBI 274	
PRBB 127	SSSI 119	
PRBJ 129	SSSS 237	
PRBM 128	TBCB 138	
PRMC 98	TBHB 139	
PRPR 284	TBHP 263	
PRRP 99	TBKA 140	
PRSP 97	TBLB 178	
PSCH 108	TBLF 177	
PSEH 282	TBLL 307	
PSHC 273	TBMK 143	
PSNR 111	TBNP 144	

